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Meeting American Science Policy

April 10, 1963

Massachusetts Institute of Technology

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A meeting of the American Science Policy Committee was held on April 10, 1963, at the Massachusetts Institute of Technology. The meeting was held as a part of the research on the role of the government in the Organization for Economic Cooperation and Development (OECD) project, "The Role of the Government in the Development of Science and Technology".

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"THE BIRTH OF NASA"

INTRODUCTION

Most Americans engaged in the Research and Development of space work with outer space work under public auspices. Professionally they may be members of university staffs or employees of private industry, but their particular projects are almost always publicly authorized and publicly supported. Since October 1, 1958 the overall direction of the American space effort has been lodged in the National Aeronautics and Space Agency, an independent civilian agency within the Executive Branch of the Federal Government. That agency directed by a single administrator responsible to the President, is provided in the fiscal year 1963 with 3.6 billion dollars for the formal legal purpose of seeking "the solution of problems of flight within and outside the earth's atmosphere and problems for the development, testing and operation for research purposes of aircraft, missiles, satellites and other space vehicles."

The object of this case is to explain why such organizational and financial arrangements exist. Why is the space program a public endeavor? Why is it directed by a civilian rather than a military agency? Why is that agency under a single executive? Why is it financially supported at such a scale and with so few Congressional or budgetary constraints as to place it presently in a unique position ^{compared to} other publicly supported enterprises?

There is, of course, a quick and apparently common sense answer to these questions. The launching of the first Soviet satellite on October 4, 1957 represented a Russian achievement in particular scientific and engineering fields which dramatically surpassed that of the United States. The American public and American political leaders viewed this achievement as signalling a dangerous and adverse shift in the balance of military power between the two nations. In the interests of national security, they made a reallocation of national

...redesigned, and the value of the ...
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 Sputnik I. It does not differentiate ...
 those political leaders ...
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 alternatives, and several possible ...
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Second, the common sense answer ...
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 a large publicly oriented ...
 public alarm and official response ...
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 look with what results ...
 space of one year ...
 neither identifies the prime ...
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... is essential if we are to distinguish between public and private management of the space effort, account for that objective in the character of the present program and arrive at conclusions as to how it might be directed for more efficient achievement of certain goals in the future.

To achieve greater precision and more explanatory value, then, the actor selects and organizes facts according to a contemporary model. If how political influence is distributed and applied in national politics. (The success of the Soviet launching is viewed as generating a conflict or issue) within the national politics system. More concretely, it expanded the scope and intensity of a conflict which had been previously confined to relatively few activists within the system and which had been temporarily resolved by the decisions of the most influential among them. Many other activists with different motivations, different political resources, different intensities of interest and operating under different informational and structural constraints were engaged. Although all the activists could be said to be motivated by common considerations of national security, their perception of that goal, their place within the system, and the impact of the conflict upon their political resources, established a second order of objectives which differentiated among their preferences of possible solutions to the conflict.

In a new and larger structural context, the activists devised strategies by which they sought to give their preferences for successive policy choices prevail. To assure the success of their strategies, they sought to make coalitions with other activists by discovering identities of interests, by persuasion, by bargaining, or by the exercise of superior formal authority, etc. The successes and failures of respective activists in carrying out their strategies

of participants in determining the outcome of the program.

Obviously, an analysis which is based on data by using a case study to identify all the relevant factors which help account for the structure and magnitude of our space efforts. Neither does it extensively characterize the properties of the frame, which is chosen to emphasize. Highly relevant traits of personality, undocumented or undocumented actions of major participants, unconscious motivations probably escape detection. Consequently, any case studies are not history. Taken together, however, with a cluster of other cases of major space decisions, this case does suggest the structure of political power -- the mix of political influences -- which directs the nation's greatest technological venture. Recognition of this climate and the probable behavior is a prerequisite for those who would affect the substance, magnitude, or operation of the present program. It is basic to understanding the characteristics, capabilities, and limitations of public management of the space enterprise.

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On October 4, 1957, the Soviet Union celebrated the honor of the members of the International Council of Scientific Unions. At 5:58 P.M. Dr. Lloyd Berkner, President of Associated Universities and Chairman of the International Council of Scientific Unions, presided over the festivities to announce to his Russian colleagues the successful launching of a Soviet earth satellite into terrestrial orbit.²² The international scientific setting of this pronouncement and the unbridled pride with which the Russian scientists received the news and accepted congratulations for their feat illuminate rather ironically the purely scientific emphasis of America's early space efforts.

Despite the scientific acclaim which greeted Sputnik I, however, as the news went out over the wires the event was soon deemed in its political implications. From a limited conflict within a small segment of the military and scientific elites, space suddenly became a major national conflict embroiling the Administration, the entire military establishment, the scientific community, the Congress and the public at large in a political issue which was to reverberate throughout every facet of American life. The reactions of national leaders prior to the launch of Sputnik had created a broad arena of national debate which brought into question America's political leadership, scientific and technological capabilities, educational system, defense policy and, indeed, her very position in the world. The year of the Sputnik had begun, and with it the birth of a new era.

1. The Administration

At the outset of the new debate it was plain that the Administration had miscalculated the political significance of Soviet technological virtuosity. This miscalculation can ultimately be attributed to the President, the apex of the American political system. It had been Eisenhower's choice, among contending advisory opinions and organizational biases, which determined the scientific nature of Project Vanguard. Thus, after Sputnik, the President's responses in the new conflict became the focal point for other actors' reactions in the now enlarged political arena.

Of necessity, Eisenhower had to evaluate the launching of Sputnik I in terms of its implications for national security, partisan politics, the power of the Executive Branch, and the program of his own Administration. With immediate evidence that a strong, perhaps even hysterical public reaction was setting in, the President faced prospects of a radical realignment of his previous bases of support.

In this posture of political defensiveness, Eisenhower's first reaction was, not unnaturally, to attempt to contain the scope of the conflict. Thus, the initial White House communiqués minimized the significance of the launching and tried to suppress the rising political storm.²⁵ In his news conference on October 9 Eisenhower emphasized that ballistic missiles had consistently and properly received more priority than satellites; that the only Soviet victory was in political propaganda; and that his scientific and military advisors assured him there was no need to accelerate defense programs. After discounting the military significance of Sputnik, he sought to calm the nation by relating that his apprehensions about national security had not been raised "one iota."²⁶ Moving to the scientific argument,

... of the ...
... an engagement ... the ...
... character of our development ...
... to grow hysterical about it.

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... project ... of an
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Others interpreted Sputnik ...
... and positive suggestions ...
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... Vice President ...
... in Congress ...
... Sherman Adams ...
... President ...
... William Knowland ...
... of his position ...
... selected to voice the ...
... "do something" about Sputnik ...

as to what was a "cold war" and "hot war" and the
of the charges that Eisenhower's advisors in order both to defend him from
personal political attack and to preserve his freedom of action

Randall and Adams, both personal assistants who had no bases of influence
except those derived from the President, and Wilson, the outgoing Secretary
of Defense, were the most outspoken believers in the Russian achievement.
Randall in an off answer, dismissed the satellite as a "lilly bubble... a
bubble in the sky."²⁵ Adams, in the same vein, asserted that the U.S.
satellite program ought to "serve science, not high score in an outer space
basketball game."²⁶ Wilson merely repeated what he had said all along:
that the Sputnik had nothing to do with military preparations or relative
missile capabilities. These men had nothing to lose from such uncritical
assertions. Moreover, their statements, while not reflecting the growing
political concern within the Administration, served definite purposes. It
was important that defense of the Administration be voiced so that its moves
to correct the situation would appear to be starting from the highest possible
threshold.

Other spokesmen for the President: Nicholas Dulles, McNamara and Nixon,
had no voice support of their Chief within the limits imposed by their other
political obligations. Dulles, although enjoying the complete confidence of
the President, was still forced to consider the concerns of his Department
and the views of his critics. Thus, it was in his interest both to support
the President and to minimize damage to his own special province by pursuing
foreign policy moves in the space arena: at once appealing to the President
and to his own critics.

The Soviets had been making extraordinary mileage out of their achievement

and editor of the *New York Times*.²⁷ In response to this barrage of successful propaganda, Dulles took two steps. Sharing in part the immunity from political pressures of the President's personal advisors, he belittled the Sputnik and emphasized the contributions of German scientists to the Soviet satellite program.²⁸ On the other hand, he did embark on two new policy exercises. First, he initiated moves toward cooperation with NATO allies in scientific and technological efforts, and an amendment of the Atomic Energy Act of 1954 to permit such cooperation.²⁹ Second, Dulles used outer space to unite the "inseparable" package of disarmament proposals which the West had offered in London, thereby proclaiming America's interest in the use of outer space for peaceful purposes.³⁰ Thus Dulles could claim for Eisenhower that the United States had initiated definite new policies in the international politics of outer space.

On another political front, Senate Minority Leader William Knowland represented the President in a Congressional arena which was becoming increasingly involved in the missile and satellite issue. Knowland, as the leader of the President's party in the upper house, was obligated to defend the Administration posture. At the same time, Knowland was obliged to protect his own role in³¹ legislative branch constitutionally divorced from the Executive. Moreover, Knowland at this time harboured Presidential ambitions. Thus he, more than Eisenhower's personal advisors or even Dulles, had to maintain a degree of distance from the President's own position.

Knowland appeared to compromise his various political obligations by calling for a "bipartisan review" of the entire defense effort as fulfilled by the Senatorial role; by arguing that politics should be ignored in assessing past

republican and a... ..

10 His position... ..

review from time to time... ..

seem like business as usual and to... ..

Administration in a favorable light... ..

Finally, Richard Nixon served as... ..

were to occupy the Administration... ..

position could be characterized as... ..

logically could not afford to... ..

the President. At the same time, it... ..

Nixon was dependent upon the... ..

Thus, Nixon both advanced... ..

Administration and... ..

In a speech on October 5, Nixon... ..

be forthcoming in response to the... ..

its security before a... ..

of government, economic... ..

was a necessary move in order to... ..

the national defense. Although... ..

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implications. He did not... ..

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it was before the satellite was... ..

shift in the Administration... ..

no greater mistake than to brush... ..

he President not only sought to limit the conflict by enlisting his supporters in a public attempt to downgrade Sputnik. He also attempted to enlarge current programs and to initiate, within the Executive Branch, new efforts which might speed America's space effort, thereby pre-empting his critics. His immediate policy choices were in three major domains: increased emphasis upon the missile program; high-level consultation with representatives of the scientific community; and a personal appeal to the people.

In the defense field, the Administration reacted to the apparent Soviet lead in rocket thrust capability by ordering a stepped-up missile program. Although this would entail no major increase of funds, rumors became current that the President would permit the DOD to spend above its \$8 billion ceiling if such action were necessary to expedite the missile program. In effect, the Administration removed certain financial bottlenecks on Research and Development work.³³ Even more important, Government officials were shifting from the initial Administration position of minimizing Soviet missile claims to "expressions of guarded concern about the status of the United States' missile program in comparison to the Soviet's."³⁴ Thus the Administration conceded that Sputnik did indeed carry implications for America's strategic missile capability.

More notable than any early policy shifts were the mode and character of the Administration's new concern. In the two weeks following Sputnik, the New York Times observed, more scientists visited the President than in the previous ten months. Dr. Devlev Brook, the president of the National Academy of Sciences, Dr. Alan Waterman, the director of the National Science Foundation, and Dr. John Hagen, director of Project Vanguard, were all present at the National Security Council meeting on October 20, which first grappled with the implications of the launching. Later in the month, Eisenhower met with his

Science Advisory Board (see p. 1) & Office of Defense Research.

the pursuit of basic research in the Federal Government and its role in technological competition with the Russians.³⁵ Indeed, this new respect for scientists as the highest echelons of co-operation was now more obvious. Changes in the Administration's attitude in the immediate post-Sputnik weeks.

Finally Eisenhower decided to discuss defense, apart from the need for an enlarged scientific effort and weapons of Government spending in a series of nation-wide speeches during the 1950s. He used these speeches as forums for assuring the country that America did not face an immediately dangerous crisis. At the same time, he announced the policy changes he had chosen to meet the Soviet challenge. Significantly, he applied himself to some Americans who expected an integrated program of national defense effort. If he did not feel a new national security program was necessary, at least he was prepared to answer the various public questions and challenges.

2. The Department of Defense

In contrast to the President's desire to diminish the conflict engendered by Sputnik, the leaders within the Department of Defense wished to capitalize upon it. Within the confusions imposed by being part of the Executive Branch, DOD officials - particularly military officers not politically dependent upon the Commander-in-Chief - argued for changes that would increase their budget in the space field. Like other actors in the political system at once responsible to the President and enjoying bases of influence apart from the President, the DOD quickly approved Eisenhower and attempted to direct his choices toward Departmental goals.

By an ironic twist of fate, Secretary of Defense-designate McNamara was visiting the ABMA grounds at Fort Belvoir when Sputnik went up. Back in Washington,

... of the President's...
... of the President's...
... of the President's...
... of the President's...

In reviewing the... and Army...
the separate nature of Project Vanguard and...
decision to account for America's comparative...
Holiday further asserted that the...
logical superiority... and...
assured reporters that...
lives of which there were many...

The Defense... since it
was charged with...
policy and failed to...
attention to American...
Deputy...
the military...
to gain from...
in emphasis...
to reach his...
claim.

McElroy... of the Department...
policy decisions...
of military support...
revoked former Secretary...
and evaluation...
been reduced to...
1955...

original appropriations level, thus suggesting available funds. Further, the Secretary lifted certain overtime restrictions on missile development work.

In the ballistic-missile field, McElroy announced that he would assume personal direction of the program, ordering weekly service progress reports and declaring himself constantly available to discuss any problems. Like the President, he believed the program basically sound, and emphasized that removal of technical and administrative bottlenecks would suffice to speed it on its way. His heightened interest, however, attracted both the Administration's increased evaluation of the Soviet ICBM capability, and the willingness to consider a larger American effort.

Finally, in the space field the DOD gradually shifted to a new emphasis upon prestige and military objectives. The Services' responsibilities varied with the level and success of their respective space roles. The Service directly responsible for the ongoing satellite program, however, echoed the Defense Department's initial reaction to Sputnik. Rear Adm. Rayson Bennett, Chief of Naval Research, depicted Sputnik as "a hunk of iron almost anybody could launch."³⁹ His commanding officer, Adm. Arleigh Burke, Chief of Naval Operations, supported this contention by arguing that America had rocket power sufficient to launch a satellite of Sputnik's weight. There was some internal opposition to this official sanguinity. Rear Adm. John T. Hayward, Assistant Chief of Naval Operations, Research and Development, later indicated that there had been some reappraisal of Project Vanguard within the Navy at this time. "When Sputnik went up and everything was confused I made the same proposal that you gentlemen have gotten legislation for now. And I was slapped down pretty hard."⁴⁰ Like the President, however, the DOD and Navy officials out-

technological feat to keep the project on schedule. Furthermore, a crash program would seem like "metooism". Instead, for the first time, the DOD turned to serious consideration of long-term, large military space projects. In the days following Sputnik, the Air Force received a sympathetic hearing on its reconnaissance satellite program, and von Braun was invited to present an Army proposal for a circumlunar space platform.⁴⁵ Although these proposals would not become operational for several years, their review by the DOD revealed a new interest in space efforts which might outstrip the Russians. No longer were such futuristic projects considered science fiction; no longer was outdoing the Russians for prestige purposes considered beyond the mission of the DOD.

3. The Scientists

In October, 1957 the American scientific community had no clearly defined role in the highest echelons of public policy making. A number of distinguished scientists and engineers had been alienated from Government work in the McCarthy era, and their outlook reached its nadir of disaffection in the years after the Oppenheimer security hearings. The military services and some other executive departments had established scientific advisory committees, but the highest echelons of formal scientific participation was in the Office of Defense Mobilization.

Sputnik signalled the reappearance of the scientists as important members of the national political system, but with uncertain objectives.

From their earlier participation in Project Vanguard, the scientists bore a certain responsibility for the U.S. position. As scientists, however, they appreciated the Russian accomplishment. Hence, a strong flavor of ambivalence characterized the immediate reactions of the scientists to the

launching. Some expressed admiration for a significant scientific feat; others were critical of the low priority given Project Vanguard and of the rejection of Project Orbiter. Underlying both attitudes was a general concern that American scientific progress and educational standards were rapidly being surpassed by the Soviet Union.⁴⁶ Moreover, many scientists cited Sputnik as evidence of Soviet ICBM capacity and suggested that America undertake a vast program of scientific Research and Development to match it. Their suggestions had impact. Torn between traditional respect for the international achievements of science and concern for America's welfare and security, the scientists were suddenly provided substantial opportunities for influence.

In the first days after Sputnik it seemed clear the scientists intended to use their opportunities. The Administration was prepared to give careful attention to their views. And as private and public debate intensified many scientists sought to broaden the agenda of subjects for high-level consultation beyond the obvious fact that the scientific satellite program needed increased support. Instead, they called for - and secured - a general review of all Government scientific policies by Eisenhower's new-found official scientific advisors.

Their voices, in turn, were heard. On November 3 John Finney reported that "for the first time, in the past weeks top government officials have been heeding the advice of scientists and educators."⁴⁷ Although the scientists did not at this time offer a clear policy of what they wanted in space, they had gained access to the President and a right to be consulted by him in future space policy.

1. The Congress

After Sputnik, the day after the launch of the first satellite, if at all how far the political conflict would be accepted by the Congress. With the Administration following a policy of restraint and the high political visibility of the satellite program seemed possible in the powerful Congressional leaders, those no exception. Such was the character of the issue that it almost guaranteed an initial reception - for it served the purposes of many legislative members.

The immediate and predictable response of virtually all Congressmen to Sputnik was a rash of public statements commenting gravely upon the seriousness of the situation. Quite beyond the notice for general publicity, however, there were other gains to be achieved for the parties and subparties within Congress, key leaders and important committees.

On a party basis reactions to the launching divided, as might be expected, four ways. The Liberal Republicans had to defend Eisenhower and at the same time push him into policy positions which were against his own sense of their prestige. Accordingly they were most anxious to limit the criticism engendered by Sputnik. Conservative Republicans, less loyal to the President, were cross-pressured by concern at the Russian advance and their long-time advocacy of the balanced budget. Their reactions were more critical of the President than those of liberal liberal brethren, and thus less designed to contain political conflict. Traditionally liberal Democrats were the chief opponents of the Administration, even more anxious to evaluate the space program in a partisan context. But this group was interested in exceeding the criticism engendered by Sputnik. The moderate Democrats, particularly the "moderates" who then, in concert, led the liberal wing of the Government.

use against himself, but because it might place limits upon his Senate autonomy as a rather swashbuckling critic of the Administration.

Few orthodox Republicans were this immune to the political risks of protesting too much about the Administration's defense posture. As conservatives, some were legitimately concerned about the expenditures which a stepped-up space program would require. Others, faced with hard campaigning in the fall, needed Presidential and party prestige for their own career purposes. Thus, some conservative Republicans discounted the Soviet achievement in the same way Eisenhower's close advisors had done. Homer Caphart evaluated the launch as "psychologically bad, but practically it doesn't mean much."⁵⁰ Alexander Wiley saw it as nothing to worry about, but rather as "something to keep us on our toes."⁵¹ Logically, it was this group which consistently accused the Democrats of playing politics with national defense.

Senator Knowland stood midway between the two Republican positions. Possessed with strong political ambitions, and a high regard to the autonomous power of the titular leader of the Senate's Republicans, his actions as Minority Leader were relatively limited. He vacillated between support of an inquiry into defense policy and castigation of Democratic partisanship. His behavior reflected a thorough realization that the forthcoming session of Congress could bode no good for the Republicans, and that it was in the majority party that the Congressional response to Sputnik would ultimately be fashioned.

As the majority party, the Democrats initially responded to the challenge of Sputnik with an attack led by their liberal wing. On the evening of October 4 Senators Symington, Jackson, Mansfield, Smathers, Anderson, Humphrey and Kefauver were already placing responsibility for the Soviet space advantage

on Eisenhower's lack of leadership and program of economy-above-all. They demanded that the missile and scientific space programs be accelerated and coordinated, and called for investigations and a special session of Congress. They scored "the soothing platitudes of the Administration spokesmen"; termed Sputnik a "devastating blow to the prestige of the United States as a leader in the scientific and technological world"; and called upon the President "to assume personal responsibility for speeding the missile program."⁵²

Similar sentiments were voiced by ranking leaders of the National Party, Truman, Stevenson, Harriman, Butler and Benton. On October 11 the Democratic Advisory Council of the Democratic National Committee issued a statement charging that "the Russian achievement is visible proof that the Administration has failed to understand the amount of effort which is needed by our country in basic research and in applied engineering if we are not to become inferior to the Russians."⁵³ In rapid fire order the Council charged that the Administration valued economy above security; claimed that, had Truman's missile program been sustained since 1953, the United States would never have been surpassed; and called upon the President to be a leader. Former President Truman chose to attack both Republicans in general and the Republican Administration in particular, announcing that in the 1958 elections "we'll rub Ike's halo out altogether."⁵⁴ At the least, there were obviously some Democrats who were gleefully prepared to try.

Despite the sound and fury, Lyndon Johnson was the chief architect of the Democrats' ultimate strategy. He was equipped with formidable political resources as Majority Leader; a moderate capable of pulling the disparate elements of the Democratic party into effective voting coalitions; a powerful member of the Senate Armed Services Committee; a man of political flamboyance

Chairman Richard Russell he was informed that Johnson had already set an investigation in motion, although diluting its partisan flavor by calling it an "inquiry." On the day after Sputnik, the staff of the Senate Committee and members of Johnson's personal staff were already collecting data. Chairman Russell waited to call the inquiry until he could contact Senator Styles Bridges, the ranking Republican on the Committee. When he did so, he found that Johnson had already arranged matters in agreeably bipartisan fashion. Thus, Johnson initiated the Senate Armed Services Committee's Preparedness Subcommittee's "Inquiry into Satellite and Missile Programs." The inquiry would serve as an event in which the whole defense posture of the Eisenhower Administration would be examined and found, under the aegis of Johnson, most seriously wanting. It would also serve as a vehicle by which the Democratic party in Congress, again under Johnson, would offer the nation a program for enhancing its security. Finally, it would put Johnson himself, and his statesmanlike concern for the nation's preparedness, in the headlines of every newspaper in the land.

The Majority Leader was clearly able and anxious to take the initiative in policy-making for national security affairs, including space. His choice to do so, more than perhaps any other factor, guaranteed that the resolution of the space issue would take place in a broad political arena.

5. The Take-off into Self-Sustained Strategy

The immediate response of the major political participants to the launching of Sputnik was in all cases a cursory examination of the profits and losses which might accrue to each from the event. The Administration and the Congress, representing general political interests within the system, had to place the onset of the space age within the broader context of national security and political climate. Each viewed the space program as a channel for the advancement

While the Administration struggled under the public pressure generated by Sputnik I, the half-ton dog-carrying satellite, and political concern.

The new satellite was a sobering reminder that the space race was a one-shot affair, but an urgent, long-term scientific and technological effort. Immediately after its launching the Administration, building upon initiatives of the previous month, began to take actions committing the U.S. to a space effort. As its intentions became clear, competition for a role in either technical-scientific or political exploitation of space became clear to all. With the decision to enter competition settled, the issues of controversy shifted to questions of who should do how much of what, and gain political influence in the process.

The Administration spent the five months after Sputnik II evolving its space policy, for the most part behind closed doors. During this period, its posture was to proclaim its intention to build a new space effort out of specific choices. Given this hiatus, other political participants were free to press their own claims while the Administration debated its choice, and to make clear their respective positions and policy preferences. The Administration's delaying action - necessary in any process of policy formulation - provided the perfect backdrop for the sustained competition of the interested agents.

These other participants set to work first to build strategic positions which might serve them best in providing a greater role in space. It would be from these positions that the Administration's ultimate proposal to establish

NASA, submitted on April 2, would be evaluated. The political participant sought to convince the Administration of its own capability in space by calling loudly for recognition of its skills and efforts. It was a veritable Anvil Chorus.

1. The Administration

Although the broad outlines of the nation's space program remained undetermined in the period between November, 1957 and April, 1958, the Administration did make certain interim organizational and budgetary decisions to speed up the present effort. But these limited steps did not suffice to stave off the critics - throughout this period the Administration remained on the political defensive. Its behavior was due in part to a continuing desire to contain the conflict as far as possible. It was also dictated by the special requirements of the Executive office in the American political process.

The nature of these requirements demands a brief explanation. The heart of the Administration's problem was that, while critics could call for an all-out space effort, the Administration itself could treat space only as one part of a broad national security effort. Necessarily responsible for the entire policy spectrum of the government, the Administration's ability to focus upon and exploit the space effort was more limited than that of its critics. Thus, no matter what the magnitude of the official effort, critics could always complain.

Yet at the same time any Administration is more able to establish the magnitude of national security policy, including space, than any other field of national policy. The "arena of decision-making"⁵⁷ for national security lies primarily in the Executive Branch; neither the public nor the Congress can significantly alter the strategic choices of the Administration, once they are made. Thus the Administration could, within limits dictated by its desire

the political survival of a president is accepted as a given, expecting that, once questions of character and magnitude were resolved within the Administration itself, it would regain its traditional initiative. (Even with the highly charged conflict which pervaded the political system, nonetheless, the Administration retained basic control.)

Thus the Administration was neither able nor impelled to outshoot its critics. Instead it acted to preserve its own freedom of choice, so that it could later exploit the relative Congressional acquiescence and latent public support which exists in any national security policy-making under Executive initiative. As events were to disclose, this was a politically viable posture. Moreover, as it was a conservative outlook, it fitted the Administration's fiscal and partisan philosophy.

So far as public statements were concerned, Eisenhower's attitude toward the space challenge during this period was one of serene calm. He reassured the nation that it was not in severe danger. His State of the Union message stressed that the present American intercontinental capability was sufficient to wreak annihilation on the Soviet Union, thus discounting any "real and present danger" to the United States. He also reiterated the theme that economic wisdom was the ultimate defense and that America could not have "both what we must have and what we would like to have."⁵³ Throughout the summer period the President constantly played these two themes: inviting national consensus in support of his program; disparaging partisans and isolationists; and urging Americans to "throw back their shoulders, thrust out their chests and say 'America is strong and will grow ever stronger.'"⁵⁴

However, inherently strong was the Administration's power position, it still suffered political damage. Eisenhower's popularity had declined 10% since the

and technical sciences to promote research and development.

To further scientific cooperation, the Prime Minister
December a preliminary agreement with the Government of the United States
research activities, contingent upon enactment of the National Aeronautics and Space Act.
support of such cooperation, the White House announced the appointment of Wallace R. Rode, Associate Director of the National Bureau of Standards as Special Assistant to the Secretary of State for Scientific and Technical Affairs.

Finally, in the field of basic research, the new bill included a request for 160 million for the National Science Foundation, which is as much as the actual appropriation of the previous year. The NASA was increased more than 50% and was advanced to the first space flight. Finally, the DOD requested 50% more than in the previous year for basic research applicable to military, aerospace and defense research, including space.

Eisenhower also provided increased funds for civilian research in space research and exploration. Although the bill originally provided for a "very considerable" increase in defense spending, Eisenhower later revised himself and authorized only a 1% increase. The bill would have authorized a 1% increase in the current year, but the projected increase in spending for FY 1959 was to be between 36 and 40 billion, as compared with 34 billion in FY 1958. This ambiguous phrase seemed to have been intended to provide a ceiling on the amount of money that could be spent in the current year. On December 10, 1958, the bill was passed by the House of Representatives, raising the debt ceiling. The bill was then passed by the Senate, raising the debt ceiling by 5 billion.

So far as defense spending was concerned, the bill provided for a 1% increase in the current year, but the projected increase in spending for FY 1959 was to be between 36 and 40 billion, as compared with 34 billion in FY 1958.

he was sympathetic to a division of space activities between military and civilian weaponry in the DOD, and overall responsibility for space activities to a civilian agency, distinguishing between "war" as in the realm of military activity in the whole scientific area (and) ... the defense aspects of this business.

It is clear that the principle of divided control of our space mission between military and civilian operating agencies had been established when Killian was instructed to draw up his report.⁷³ After this time White House spokesmen substantiated this principle in increasingly forceful terms. On February 17 Nixon stated in a speech at the Jet Propulsion Laboratory that the exploration of space was a civilian task for "basic reasons": Nixon, "research as well as operations in this field (should) not be established by military need and military opinion;" since such military limitations would, in Nixon's view, put unnecessary and destructive limits upon scientific investigation. Furthermore, he considered it "vitally important" that we continue to emphasize what our efforts (in the space and research fields) are for peaceful purposes.⁷⁴

In late March Eisenhower made his fifth explicit commitment to civilian control of space: "I expect to send up shortly recommended legislation providing for civilian control and direction of governmental activities incident to a civilian space program."⁷⁵ On the same day he released "An Introduction to Outer Space," the space primer prepared by Killian and his committee, under the direction of Dr. Edward Teller. This primer outlined a proposed program for scientific exploration of space and to that end directed "That" on April 2, Eisenhower sent up his message to Congress proposing the National Aeronautics and Space Agency with expanded authority and mission to direct all American projects in space. However, it was these projects, particularly concerned

to the very foundation of the Department of Defense. The role as violation of the dogma is to issue orders to the Department of Defense around the key concept that technology-oriented dimensions would be distinguished and separated out from the military dimension.

2. The Department of Defense

The Department of Defense is both a part of the Administration and a military establishment vested with the responsibility of defending by force the national security of the United States. This vision requires such vast resources and specialized personnel that the Department can exercise a significant degree of independence apart from the political control of the Commander in Chief. Moreover, within the Department the Services have analogous independent power positions. While outlining the separate space policy positions of the Department vis-à-vis the Administration and, in turn, of the Services within the Department overturns the organization chart, it acknowledges political reality.

The civilian officials in the Office of the Secretary of Defense as members of the Administration, publicly supported Eisenhower's level of commitment to the space effort. As military officials, however, it was also their duty to impress upon the President the potential military significance of space exploitation. Moreover, each service sought to protect and extend its mission in space in opposition to each other's claims, while together pressing a broad program of space activity upon the civilian officials in the OSD. Thus the DOD was at once an extension of the Administration, a single military agent making peculiar strategic demands upon the Administration, and a multiple agent expressing divergent service claims of space capabilities. This Janus-faced quality of the DOD makes the task of subsuming the claim upon America's

"We have to be the first with it," and do not let the enemy have any kind of military weapon development. We have to be the first to it, say so. It is necessary to recognize and give the game the importance of some very novel kinds of weapons which some people are likely to brush off as Buck Rogers stuff." 64

Soon this recognition of the political and public relations implications of space for military activities led to organizational changes and Research and Development programming of considerable significance. Despite an early emphasis upon missiles, it became clear that the jet engine ranked a major role in whatever space weapons appeared.

The first evidence of such military claims was the organization of existing military space programs. The OSD asked the military Services, "What the Services

On November 25 McNamara announced that he would appoint a new Director for the development of advanced research projects. In effect, a single manager for space and other advanced matters. Until this agency could be set up space would be under the jurisdiction of HqAFM, the Director of Guided Missiles. 65

McNamara was intent upon this mission being organized within the OSD - precluding the possibility of a Service taking overall control over the individual space program. 66

In keeping with OSD philosophy, when the Air Force set up a new Directorate of Astronautics on December 10 to manage advanced space programs within the Service, Acting Secretary Quarles announced that it had asked the Air Force to delay such action until the new Advanced Research Projects Agency was organized. Quarles claimed that the OSD, while not opposed to the Air Force plan, considered it premature. 67 The issue was closed when Secretary of the Air Force, William E. Douglas, suspended the order on December 13 under OSD instructions. Department officials felt that "apparently the Air Force

and establish a position.⁸⁶ They will quickly be in a position to usurp the military space research

The OSD intent was "an immediate one step plan under a single manager. First time this has been done in the DOD - moving operating units out of the Research and Development work that goes on in the non-missile-universe from and to the satellite and space applications field."⁸⁷ The ARPA was to have authority to develop such weapons and equipment over the Services' development and use. McNamara testified that after careful review and all the Services' and entire DOD was agreed that the new agency would cover all activities of any Service in these areas.

In December, however, the OSD modified McNamara's announced plan for a single-managed, in-house-capability agency. Holzman testified that

"If that group took off and dove head first into engines and everything... it would be wasteful... Not planning and thinking... is that we will be a cooperative group, not fighting, and will use the available material, let's say, to help out in (the agency's) program."⁸⁸

This change reflected a serious struggle within the DOD. In competing for particular space missions, the Services had adopted a long position for or against the prospect of an all-powerful operating agency for advanced Research and Development.⁸⁹ Moreover, a wide variety of objections were being raised, the potential disruption of the Services' contracting and contracting procedures with the Services.⁹⁰ Concerns were respecting the establishment of the ARPA continued to trouble McNamara through a director for the agency.

Thus, as ARPA came into existence, the exact structure of the new agency's potential authority remained unclear. Nonetheless, McNamara's general position had Eisenhower's support. On January 7, 1958, President sent a message to Congress

...ing ... the ...
the AFPA in the Supplemental ...
... and ... the ... of ...
... and ... of ...
... and ... of ...
Shortly thereafter ... the State of ...
that:

"Some of the ... technology ...
do not ...
Services, ...
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The Administration ... AFPA ...
well within the broad ...
...
abolish or ...

The Congress ...
legislative function ...
its approval. Consequently, ...
largely a stop-gap measure ...
space organization. The conference ...
Bill directed the Secretary of Defense ...
advanced weapons systems, ...
and permitted the Department ...
projects as the President designated. The Committee, however, ...
specific reference to the AFPA, ...

In February 1960, the Joint Chiefs of Staff announced the formation of AFPA and the appointment of Mr. Roy W. Johnson. The relevant Directive⁹⁴ provided for an agency for the direction and performance of research and development projects, "including the nation's space research and the development of space weapons. AFPA was authorized to contract for research and development work with other agencies of the Government and provide facilities or to acquire such facilities as it might need. Thus the DOD had established what was on paper a powerful operating agency, the only organization in Government with the explicit mission of developing advanced space projects.

With AFPA established, the OST moved to give substance to the newly invigorated military space program. It requested proposals from the Services for military space projects as an effort to avoid inter-service rivalry.

Against stiff opposition, Eisenhower and later AFPA reviewed a number of projects, although most decisions were postponed pending refinement of the organization. Among those decisions which were made in order to carry out the DOD's temporary responsibility for space programs were the

November 8 authorization of the Apollo Project, Explorer, and the March 24 directive ordering one or two lunar probes under Army planning, three under Air Force direction and ^{the development of} ground scanning system

by the Navy. Military space programs were being planned, but we know that one of these, the Air Force reconnaissance satellite, the Bird Plane, was funded during this period. Key decisions about the main space program, the one-million-pound work program and earlier and smaller satellite programs were not made. Although the program was in the planning stage

added to the command. However, the 1959 budget request

on these programs, pending final decisions.

Conflict concerning responsibility for the space effort was evident in various Services and ARPs and between the Defense and the State Departments of the space mission contributed to the relative lack of support for the ARPs' programs.^{9b} Yet the level of support ARPs enjoyed was a result of conscious policy choices on the OSD. John Homan, *former New York Times* reporter of the best informed persons of ARPs' efforts during the entire period, suggests that the "deliberate" pace of the program's development reflected the apathy towards space as a major concern of the ARPs and the Administration. Although this is a fair statement in part, for the unassisted organizational growth of the ARPs during the entire period 1945-1959 officials assigned to the space mission, while admitting that the military establishment should be approached to define those areas of space development which might contribute to the national mission, the OSD and the military space efforts agencies were slow to clear the defense budget. The resultant assessment embodied in the military space budget for FY 1959 indicated that the OSD was not pressing an urgency for military action in the military exploitation of space."

^{9b} The FY 1959 budget request for ARPs was 520 million dollars. Of which 300 million was for nonmilitary lunar and scientific satellites to be developed and operated by the civilian agency; 300 million for an anti-missile defense system and for the Pied Piper, and the remaining 90 million for all other space programs. These included projects that were both clearly military and also those facilities or military nature (as under discussion) the anti-space program, the million-pound engine, weather and intelligence satellites, satellite tracking systems, instrumentation projects, and development of space launchers. See pp. 1164 and also NYN, May 25, 1959 and 1164 and 1165 by John Homan.

low priority basis conflicted, of course, with ^{the Administration's} Administration policy. In 1959, before the OSD established the ARPA, Eisenhower announced that the Killian Committee would investigate organizational alternatives for the nation's future space effort.

By implication ^{the Administration} the Administration contradicted the OSD's ^{reform} As early as November, McElroy suggested that the DOD take responsibility for developing the civilian uses of space if requested by a civilian agency to do so. "Our responsibility," the Secretary maintained, "on the civilian aspect of satellites involves whatever decision another agency of Government wishes to make in respect to using us. In that case we are glad to offer our services if we can be helpful but we do not consider that it is a responsibility of ours to initiate in that field."⁹⁵ He agreed that the Government should pursue basic research and exploit civilian potentialities in the space field and that the National Science Foundation, AEC, and NASA all had responsibilities in the area. Since, however, the only capability for exploring space lay in the military, he conceived of a civilian space program as one of collaboration between the military developer and the civilian user. The model uppermost in his mind was apparently that of the IGY in which a civilian agency designed a scientific mission in space which the DOD performed. To implement this relationship his sole suggestion was that Killian should study "whether there cannot be some improved coordination of the research activities in these various parts of the Government. (since) I think that it is possible to make improvements."⁹⁶

During the months of policy hiatus, the DOD's opposition to a civilian space agency was almost axiomatic. Holaday testified on December 13 that the establishment of an independent civilian commission to control the scientific

The Navy

The Navy was the least involved of the three Services in the early days of space. It did not view space as a natural outgrowth of its mission, but it did express interest in exploiting certain navigational, communication, and meteorological aspects of space. Furthermore, it did have to carry on with Project Vanguard.

That Project seemed rapidly to lose its charm for the Service. After the first two Sputniks the Navy maintained a decorous posture, merely reiterating that the Vanguard was on schedule. This entailed four test vehicle launchings some of which might carry six-pound test satellites, between December and March, and six fully-equipped twenty-pound scientific satellite launchings to fulfill IGY commitments by the end of December, 1958. When the OSD announced authorization of Project Explorer to supplement the Vanguard on November 8, the Navy publicly welcomed the Army aboard the scientific venture. It continued to stress that neither Soviet nor Army competition would alter its plans. Unofficially, however, the Navy attempted to accelerate the program, indicating that, if initial tests were successful, a fully-equipped satellite might be launched in January.⁹⁸ With the failure of the first test on December 6, in the full glare of national and international publicity, the Navy fell silent and concentrated upon keeping the project on schedule. Subsequent postponements and still another failure before the first successful test launch on March 17, plus the successful Army launching in January, downgraded the project still further. Indeed, the OSD seriously considered eliminating Vanguard and utilizing some of its components in Army and Air Force satellite vehicles.⁹⁹

Under the cloud of failure the Navy continued to emphasize that Project Vanguard was a purely scientific endeavor with no importance for either naval

Navy Research and Development people, however, dissented from these views. Dr. John Hagen, Director of Project Vanguard, emphasized both the military and political significance of space, and recounted his dissatisfaction with the low priority placed upon the Vanguard. Hagen particularly stressed the need for scientific research in military development and complained that the DOD gave basic research virtually no priority.¹⁰² As far as organizational alternatives were concerned, he argued that:

"What is needed -- and the precise location of the organization is perhaps debatable -- is a single organization devoted to this type of work (space investigation and flight). Whether that organization would be better placed in the DOD or whether it is better in a separate agency is the question to which I do not have the answer, but I know it would work within the DOD. There should be, however, this single agency into which policy decisions would be passed and then both the authority and the responsibility for action would be given to the agency."¹⁰³

This reflection of professional scientific rather than Service bias introduces yet another set of particular interests and missions existing within the DOD.

The Research and Development scientists, both civilian and military, shared many attitudes with their professional colleagues and yet were among the most outspoken advocates within Government, for a high priority program of great magnitude in space exploration. They were also to be the most sympathetic individuals within the DOD to the concept of a civilian space program.

The Army

In sharp contrast to the Navy, for the Army space exploration was a matter of profound significance. Unequivocally, Service spokesmen favored the establishment of a centralized military agency to conduct space Research and Development.

The reasons were not obscure. The Army had already proved that its research teams and facilities at the ARMA and the Jet Propulsion Laboratory were capable of undertaking advanced space research projects. Yet it labored under a currently

...the military assignment in ballistic missiles ...
shakeup of the Army, specifically its Research and Development elements ...
convinced that its teams could be preeminent in a military space effort ...
if space were to remain divided among the respective Services, it seemed ...
that the Air Force would assume an increasing portion of the mission. The
immediate tasks as Army leaders defined them in the months after Sputnik were
therefore to impress the DOD officials with the Service's capability in space
and to support the establishment and decision-making powers of the ARPA.

Four days after the launching of Sputnik II, the Army received its chance
to prove itself. McElroy authorized the launching of Jupiter-C test vehicles
carrying an eighteen pound Explorer scientific satellite to supplement Project
Vanguard in the IGY. Determined to avoid an Army-Navy satellite race, however,
the Secretary declared that the OSD would retain authority over the launching
schedules of the two projects. Although the Army had sought the mission vigor-
ously for three years, now it was apparently caught off guard. It was also
disappointed by remaining within the framework of the IGY and hence the constraint
of having only a limited satellite mission. Medaris and von Braun announced that
the DOD directive failed to provide precise information about the number of
satellites to be launched and the schedule to be met, and continued: "until we
are sure that we fully understand the participation that is expected of us we
will have no comment."¹⁰⁴ Thereupon, the OSD directed the Army to proceed immedi-
ately with modifications of the guidance system for the Jupiter C, ordered the
Navy and National Science Foundation to provide the satellite instrumentation,
and specified that the Army was to undertake two launchings, the first around
February 1. At this point the Army plunged full speed ahead, convinced that it
could beat the Navy in launching a full-scale satellite.¹⁰⁵

In Medaris' words:

"I have language from the Army that says in good old-fashioned military terminology 'you will on or about such and such a date do so and so'. the directive I now have is in words of one syllable and leaves nothing to the imagination. It just delights my soul."¹⁰⁶

He and his team were justifiably confident. The Jupiter-C, previously prepared as a satellite launching vehicle for Project Orbiter in 1956, was almost ready, requiring only a modification on the nose-cone and the addition of some minor components to return it to its original form as a satellite carrier. When the first Vanguard exploded on December 6, Army preparations speeded up. And on January 26, when the second Vanguard shot was postponed, the Army was officially authorized to make the next attempt.¹⁰⁷

At 10:48 P.M. on January 31, 1958, America's first earth satellite, the Army's Explorer I, was launched into orbit. The Research and Development team under von Braun and AFMA officials immediately issued abrupt, forthright statements that the Explorer had proved the "capability of the Army's scientific and industrial team in the realm of outer space exploration."¹⁰⁸

Lt. Gen. Arthur G. Trudeau, the new Army chief of Research and Development, mentioned the entire Service in his boast: "the Army has never let the people down yet; ... any time they give us the ball we know what to do with it."¹⁰⁹

On a more parochial level, the Explorer's home town of Huntsville celebrated New Year's Eve all over again. Fire engines and police cars unloosed their sirens and ten thousand shrieking citizens roamed through the streets, carrying placards with such messages as "move over Sputnik, space is ours" and

"our missiles never miss."¹¹⁰ Only one breach appeared in the convivial spirit. After the tracking station in the Azores had picked up the satellite's signal, an aide asked Medaris whether he should contact Washington. The General is

reported to have responded: "not yet, but when even a little

The Army's jubilation stemmed not only from the successful launch but from the prospects it raised for the Army's subsequent role in space. All echelons expressed the opinion that the space mission was at the very least more important than any mission in the military establishment. Given the restrictions upon the conventional man-power capability of the Army and the two-hundred-mile limitation placed upon missiles under Army operational control by Secretary Wilson in November, 1956, space offered the Army a new lease on life. Hence its spokesmen's emphasis on the significance of space for military purposes was never divorced from an implicit assertion that Army teams were well-qualified to go into space.

Secretary Wilbur Brucker argued that it was imperative to demonstrate capabilities in the satellite field, adding that "the Army has a unique capability to make significant and early contributions to this conquest of space."¹¹¹ Gen Gavin Fleetly stated that unequivocally space exploration was "the most important thing confronting the country today."¹¹² He viewed the military satellite as a development of "tremendous significance, perhaps the most significant thing of our time,"¹¹³ and gave it higher priority than the development of ballistic missiles. Although emphasizing the political and scientific significance of space exploration, his major concern was with achieving military control of space before the Russians did.

"You have got to get out there and get in there first and be able to sit down in international councils and determine as to who is going to be out there and who is to do what out there."¹¹⁴

In Gavin's view the control of space would dictate control of earth, and while he could not predict the changes space would introduce into the daily lives of human beings, he predicted "tremendous things will happen and we must get out there."¹¹⁵

and facilities had proven capabilities in space research.¹¹⁵ Not coincidentally perhaps, he depicted the Army as fully qualified to participate with other Service Research and Development means in such an effort.

With such interests, it is not surprising that the Army gave strong support to the establishment of the ARPA. Brucker indicated that he preferred a centralized space mission within the OSD, adding that he sought no disagreement with the Air Force but that centralized direction could best utilize the capabilities distributed among the various Services. Gavin, who argued strongly for a competent military staff directly responsible to the OSD, concurred. Madaris, the Commander who would be directly under the supervision of such an agency, were it established, also favored a single decision-maker (although he opposed an operational agency within the DOD which would remove the space mission from "experienced teams.")

"I believe sincerely that the best method for achieving it is that there must be someone responsible only to the Secretary of Defense; that is, right at his right hand, who is assigned by the Secretary and the President the power of decision in the things that were outlined in (the Army program) which do not exist, the authority to say yes, and the courage to do so, who through the medium of a very small staff can carry out the necessary job of assigning these projects, approving the total plan, assigning the resources, and monitoring the total competency to see that they do not fall backward."¹²⁰

Such an agency, in the minds of these Army officials, would properly protect the interests of their Service. Yet, while the Army sought centralized direction for the space mission, it was intent upon maintaining military control. Madaris reflected this Army position in his adamant opposition to an independent civilian space agency.

"I believe that that individual (decision-maker) should properly be within the DOD, since otherwise you will have great collision of resources throughout the whole system by his being, by there being unfamiliarity with the current state of other things which affect the availability of resources and manpower in the different areas

required to carry these things out, whereas, if he is working as a direct subordinate of the Secretary of Defense, he will normally and naturally be fully informed all the time with respect to the current status of other demands and will therefore place his requirements on people who are most able to carry them out."121

According to Army officials, a civilian agency divorced from the DOD would cause total confusion and seriously hinder the nation's venture into space.

As in the case of the Navy, however, Service scientists differed from their colleagues in uniform. Von Braun's proposal for a new space organization envisaged a broad, expensive national space program under what he terms a "national space agency" either in the OSD or as an independent, civilian agency, and armed with both in-house facilities and contracting authority. His major thrust was that:

"This kind of thing obviously does not belong in the Navy or the Air Force or the Army. It is a development of an entirely new technology..."122

He noted that at the moment the Services were jockeying for position in the space contest and urged that no single Service be permitted to gain control of such a crucial mission.

Although the elimination of Service rivalries seemed his major concern, von Braun indicated that the scientists and the military differed in their views of the proper locus for the space mission. Hesitating initially to state his own choice, under Senator Johnson's close questioning he conceded that he ultimately would prefer to organize the space program in a way comparable to atomic energy. For the short run, however, he settled for assigning the space mission to the OSD with Service Research and Development and missile capabilities utilized as their office choice."123

Thus the Army presents a coherent posture of favoring a broad military and scientific space effort under centralized, although non-operational direction

by an agency within the OSD. Such a position favored the Army's participation in space; for, were one Service to receive the mission, it seemed unlikely to be the Air Force. If the OSD were in charge of allocating space projects, however, Army leaders believed that its proved capabilities in scientific and military exploitation of space could secure a very respectable slice of the pie.

To a limited extent the DOD did permit the Army to exercise its space capability. In February it authorized a Ground Explorer shot and gave informal approval for two fifty-pound satellite launchings with the Jupiter-C rocket vehicle. In March it directed the Army to use these two satellites for lunar probes in the IGY program. And, according to Medaris, the OSD requested a firm schedule and budget proposal for Army space projects through December, 1958. Medaris indicated that he anticipated the Army would "get the go-ahead on at least the first twelve months of this program."¹²⁴

Yet at the same time there were indications that the Army would not win the long-range space mission it so avidly sought. In January, the retirement of Lt. Gen. James M. Gavin, Army Chief of Research and Development, was an ominous sign that the Service could not expect OSD support for the reorientation of Service and military structures necessary to exploit a massive new program. Gavin indicated to the Senate Preparedness Subcommittee on January 6 that his vigorous advocacy of an urgent space effort hurt his chances for promotion. Implicitly he suggested that the DOD's evaluation of the Army's special space role and appropriate program was far from his own view. Announcing his resignation he explained:

"I don't want to defend next year's budget because I don't believe in next year's budget, the Research and Development budget, of the Department of the Army. I don't want to be put in the position of coming before Congress and saying that I approve of certain things that I don't."¹²⁵

Confirming Gavin's fears, John Finney of the Herbert A. Thomas on March 6 that authorities within the OSD were predicting that through scientific or "prestige" assignments would still be made to the Army, the Air Force would be charged with developing military applications of outer space. McElroy, according to Finney, considered space exploration consistent with the Air Force's overall function. Such an assignment was precisely the opposite of the Army's goals.

The Air Force

The Air Force position stemmed from an earlier allocation of missile responsibilities. The Air Force had operational control over much of America's booster capability: the Thor ICBM, and the Atlas, Titan and Minutemen ICBMs. Moreover, it had been working in space research since the end of World War II. This program was almost entirely military, and hence classified, but throughout the months after Sputnik, ongoing projects received enough public attention to indicate that the Air Force was more deeply involved in military exploitation of space than any other Service. Bolstering these advantages was the Service's claim that the space mission was a natural outgrowth of its military responsibility in the earth's atmosphere. Accordingly, the Air Force saw its interest to be that of resisting, or at least slowing, the centralization of the space mission within the OSD. Its rule of thumb was that the less control granted, the more might fall to the Air Force.

The Air Force's evaluation rested on an interpretation of space exploitation as a natural extension of the ballistic missile program. Although ardently contending for the space mission, the Air Force sought above all to protect the status of its on-going aircraft and ballistic missile programs. Hence, top officials in the Service, like officials in the OSD, concentrated on

the need to maintain control of the air with ballistic missiles. Under pressure, Secretary Douglas stressed that space developments and ballistic missiles should be given equal priority, but added "I would like to leave the priority with the ballistic missile program to the extent that the two might conflict."¹²⁷ Similarly, Richard E. Hoxner, Assistant Secretary for Research and Development, argued it would be "utter folly to reduce the sense of urgency on the ballistic missile program at this time"¹²⁸ and agreed with Douglas that, if ballistic missiles and space operations were competing for resources, the missiles should be given top priority. Such competition could, of course, be avoided if the price of both missions were determined economically by the Air Force.

Only Gen. Bernard Schneider, Commander of the Air Force Ballistic Missile Agency, specifically stated that in long-run terms, national security would depend upon space superiority.¹²⁹ Yet he, too, argued consistently that 90% of the developments in the missile program could be applied to space and that the two must move together.

"The entire astronomical development program which I have touched upon can be initiated at once, with no diversion in diversion of our ballistic missile programs. As I analyze the future, if we are to meet the challenging requirements of either ballistic missile acceleration or of astronautics, we must recognize where our strongest capabilities lie today and make certain decisions now."¹³⁰

In short, all the Air Force witnesses who testified before the Preparedness Subcommittee argued that space was important, even crucial, but not so important as to divert resources from ongoing missions. Hence, Air Force spokesmen did not argue, as the Army had, that space was the most significant arena of potential military activity. Instead, they evaluated the significance of space for national security and sought to pace space exploitation in terms of the development of Air Force roles and missions.

The Air Force had a strong case, both logically and empirically. Ballistic missile capability provided a fine basis upon which to build an astronautics program and Air Force officials constantly repeated this refrain. Gen. Schroever argued that "our present studies have shown that by using our presently existing rocket engines and missiles, we can provide both at the earliest date and at the greatest economy, not only unmanned reconnaissance of the moon, but also a basic vehicle for manned space flight."¹³¹ Indeed, he stated that current Atlas, Titan and Thor programs would provide booster capacity for all the space missions of interest to the DOD for the next ten years. Moreover, the Air Force had ongoing space programs in a broad range of fields. It had engaged in high altitude research to study cosmic rays, thermal characteristics and effects upon human beings launched in balloons. The School of Aviation Medicine at Randolph Air Force Base had been investigating medical aspects of outer space, and Research and Development groups in the AFMMA had been working on guidance and propulsion problems of space flight. Air Force witnesses argued that this comprised a broad, comprehensive program in which the Service was making real progress.

Specifically, two Air Force space projects were in the final stages of development in the early months of 1958. The X-15 research aircraft, developed with NASA cooperation, was scheduled to fly in early 1959. If successful, this model would permit man to fly at speeds above one mile per second and at altitudes above one hundred miles, at the boundaries of outer space.¹³² and hence presented many of the reentry problems confronting manned satellite flight. Second, the M7-L reconnaissance satellite, or Pied Piper, was closer to operational deployment than any other military satellite program. The OSD had authorized the Air Force to move into the systems development stage shortly

before Sputnik 1 and subsequently accelerated the program.¹³³ The Air Force hoped to launch a test vehicle by October, 1958 and to launch the first actual satellite by Spring, 1959. The test vehicle, incorporating certain components of the final satellite, would use the Thor booster; the satellite itself would eventually utilize the Atlas, thereby promising a significantly heavier payload.¹³⁴ Both programs called attention to the Air Force's capability for scientific and military exploitation of outer space, and the Service used them to bolster its claim for operational responsibility in this field.

Organizationally as well, the Air Force undertook to preempt the space mission. On December 10 it established a new-lived Directorate of Astronautics with Brig. Gen. Homer Boushey, Deputy Chief of Staff for Research,¹³⁵ as its director. According to the Air Force, the new Directorate would be an internal management organization to pursue and coordinate advanced research projects within the Service under the overall guidance of AFPA. As indicated earlier, the OSD interpreted this move as a clear Air Force attempt to establish hegemony in the military space program and to undermine the AFPA. But the announcement of these plans by Donald Felt, Deputy Chief of Staff for Development, was a measure of the enthusiasm with which Air Force officers, particularly those in Research and Development, viewed the space mission as an extension of Service responsibilities.

Like the Army, the Air Force presented a plan for future space exploration to the OSD which would further the Service's long-run interest in space. Unlike the Army's national plan, however, the Air Force offered proposals which were primarily to be executed by Air Force facilities. The most significant divergence from the Army's plan was the Air Force's disbelief in the necessity of developing a single, million-pound thrust engine. The Air Force preferred to

ely on combinations of the existing rocketry

General Thomas D. White, Chairman of the Joint Chiefs and
 Lt. Gen. Clarence S. Irvine, Deputy Chief of Staff for Material, USAF, had
 predicted already that the next war would be fought by space weapon systems.¹³⁷
 The Air Force space plan now reflected this prediction by providing an evolu-
 tionary shift from present ballistic missiles to future space weaponry. In
 the first stage, the present Thor booster with second stage hardware from the
 Vanguard could reputedly lift 3000 pounds into orbit, in late 1958.¹³⁸ With
 additional third stage hardware, the Thor could permit unmanned reconnaissance
 of the moon, impacting a small instrumented package upon it, by the end of 1959.
 A slightly modified Thor with a high-energy fueled upper stage already under
 development could put a larger payload in orbit, make initial unmanned recon-
 naissance of Mars and Venus, or send an instrumented recoverable package around
 the moon. Later the Atlas could make soft lunar landings and the Titan, with
 high-energy second and third stages, could put ever greater weights into
 orbit, support extended manned satellite missions, deliver larger payloads
 to Mars and Venus, or launch manned circumlunar flights. In addition to building
 the required booster capacity for these programs, the Air Force emphasized that
 it was currently working on the guidance systems, payloads, and manned experi-
 ments to be used in the projects." In other words, Schweitzer concluded, "we
 are not just groping around. We can actually specify things."¹³⁹

It was obvious, however, that what they specified was a program to be under-
 taken primarily by the Air Force. To men like Gen. White, this was utterly
 logical since the Air Force was "synonymous with air warfare" and space was merely
 a natural extension of air.¹⁴⁰ Hence, contrary to its typical support for greater
 centralization within the DOD, the Air Force was bitterly opposed to the estab-
 lishment of ARPA. In the words of Gen. Irvine:

"What we don't need down in Washington is more commissions, more czars and more organizations. We have a President, a Congress, an Administration, and a Secretary of Defense. I said and I say again, we don't need any more czars or any more institutions. We need decisions by the Secretary of Defense and we need less people in the OSD. We need the delegation to the three military departments of the jobs that belong to them, and somebody with guts enough to hit them over the head if they don't do it that way."¹⁴¹

The chief impediment to progress in space, according to all Air Force witnesses, lay in separating Research and Development of weapons systems from their military user. In Gen. White's words, "I would naturally prefer to have it (space) in the Air Force because I think we have done more in that respect than anybody else, by a very great margin, and naturally I would like to go on with it." Believing that space was within its mission, the Service was therefore determined to keep space Research and Development in its own laboratories.¹⁴²

So, in addition to pressing its own claims in space, the Air Force disparaged the concept of a strong operational space agency within the OSD. Schriever argued that "any program to establish a separate astronautics management agency would result in duplication of capabilities already existing in the Air Force ballistic missile programs at a cost in funds and time similar to that already expended on these programs."¹⁴³ Schriever admitted under close questioning that he did support a central decision-making agency.

"If that is the way it is set up, I am all 100% for it. But if attempts to set up a procurement staff and do the contracting out of the Pentagon and set up a big technical staff there and make all the technical decisions, I say you are not going to set up a very good thing. The draft of ARPA that I have seen to date... does go to the point where they would set up their own labs, perhaps; they would set up their own procurement organization. This kind of an agency is what I am against. Now they may set it up."¹⁴⁴

But a low-powered ARPA was only acceptable to the Air Force, not its preferred choice. Gen. White indicated a willingness to go along with the establishment of the ARPA with the proviso that "no matter who develops these things, the

Service that is going to use the end product should be cut in from the beginning."¹⁴⁵ And, he immediately added, the Air Force would be the primary user of such end products since it utilizes "everything that fits into our roles and missions, and in my opinion, almost everything in space does."¹⁴⁶

Once assured of major operating responsibility for military space exploitation, the Air Force came to accept the existence of a downgraded ARPA. Unlike the Army, the Air Force's future in space depended on a narrow definition of ARPA's functions. In its view, the agency ought to be limited to high level decision-making, duly respectful of the Air Force's responsibility and capability for pursuing its roles and missions out into space.

Thus the Services each added its own evaluation of the space effort and organization which the DOD should adopt to that of the OSD. By the end of March, however, problems raised by the ambiguous powers of ARPA were further complicated by the President's advocacy of a civilian space agency to share responsibility with ARPA for the exploitation of space. The attitudes which the OSD and the individual Services took toward the proposed NASA were derived from those which they had adopted toward the ARPA. Their new strategies, however, were more similar than the earlier ones. While disagreeing among themselves as to the organizational and budgetary support necessary for military exploitation of space, they were at least agreed upon the need for exploitation by the military establishment. Confronted with a civilian challenge to their freedom to determine what programs were to be considered militarily significant, the Services closed ranks with the OSD. As stalwart defender of the popular faith of national security, the military establishment used its substantial resources of power and influence to meet head on other political actors who doubted either the wisdom or the utility of turning space over to the generals.

Sputnik both popular and political science in America. The government responsible for national policy-making had recognized the specialists the technical skills necessary to meet the current needs and had **called upon** them to be the "barriers" of the nation. The scientific community responded with uncertainty and ambivalence and unlike other political groups remained essentially unsure of their strategy in space policy-making throughout the subsequent months. This conflict arose, in essence, because the scientists continued to be uncertain of their objectives even while their new political influence was on the rise.

Three important attributes characterize the scientists' political behavior throughout the period of policy-making. First, they were entering the political arena as relatively inexperienced participants. Second, they faced many unresolved questions in their relations with the Federal Government which they considered more fundamental than space and the impact of Sputnik on their own view of the Soviet crisis as a vehicle for the overall reconstruction of their relationships with Government. Their own crisis preceded them in actively engaging in policy-making for space. While these characteristics were common to the entire scientific community, the degree of difference and of emphasis changed among the groups outside and within the Federal Government. These differences in turn contributed to the policy process.

1.1 The Non-Government Scientists

The scientists outside of Government felt these pressures most acutely. During the period from November, until April, they displayed considerable concern with the evolution of national space policy. Little time would pass

the status of the scientist. To these ends they urged basic reforms along a variety of fronts. They called for federal support of the educational system, both to make it more challenging in general and to increase the amount of scientific instruction in particular. They sought increased government support for basic research; greater recognition by the Federal Government of the scientific input in weapons development; better organization of military Research and Development programs; and greater mobilization of the nation's scientific capabilities for the national security effort. They recommended better working conditions for scientists in federally supported projects or Government agencies, including more translation facilities, less restrictive contracting procedures, freer exchange of information with other scientists, and less stringent security measures.¹⁴⁹

On these broad issues, the voices of the scientific community were loud and strong. There was, however, only passing reference to space and markedly little precise opinion in the public record concerning either the significance or the potential organization of the space effort - with the exception of a few proposals by particularly space-oriented scientific fraternities or organizations. When these did appear, furthermore, they supported the IGY view that the space effort should be directed towards what might be scientifically valuable.

In testimony before the Senate Preparedness Subcommittee, the star scientific attractions: Drs. Teller and Bush, only mentioned in passing that space should be a specific arena of activity in an expanded scientific effort.¹⁵⁰ In two public speeches in January and February, 1958, Dr. Isidor Rabi, the chairman of PSAC, while referring to the satellites as "an accomplishment... of utility,"¹⁵¹ urged America not to allay its sense of urgency in general

scientific progress be made. The successful Explorer 1 mission and the organization of the scientific effort, various scientists such as Dr. Arthur Compton and Dr. Lee DuBridge praised the Killian appointment, but did not assign him any particular role in organizing the space effort.¹⁵⁴ The major general scientific association to meet in the months following Sputnik III, the American Association for the Advancement of Science, made no mention of a space program in the report of the Parliament of Science, although most of its discussion was devoted to "science and public policy."¹⁵⁵

There were, in fact, only five scientific organizations. Three of them particularly involved in the space sciences, which offered any unsolicited proposals for the organization and implementation of space. These statements included a proposal for an Astronautics Research and Development Agency to control outer space development, presented to the President by the American Rocket Society on October 14; a petition in The New York Times from the editors of Missiles and Rockets suggesting a National Advisory Committee on Astronautics on November 7; a proposal for the organization of a National Space Establishment submitted to Dr. Killian on November 21 by the Rocket and Satellite Research Panel of the National Academy of Sciences; a joint summary proposal of the American Rocket Society and Rocket and Satellite Research Panel issued on January 4; a statement by the National Society of Professional Engineers on February 13, recommending the establishment of a Federal Space Exploration Commission; and finally, a statement by the Council of the Federation of American Scientists suggesting control of outer space by the AEC along the lines of a bill, S 3147, currently sponsored by Sen. Clinton Anderson.¹⁵⁵

Although varied in scope and organizational detail, each of these proposals suggested an independent, federal space agency (commission outside the DOD using either the NACA or the AEC as organizational models).

be for the use of the NSB in the future of the space program. The future of relations between the military and the civilian space channels for mutual cooperation and coordination in the use of space vital military need on the one hand and the advancement of space research on the other. Finally, the program is directed with emphasis upon the potential space travel, cultural and intellectual contribution of space research to the United States and the world. Space was regarded as an "endless frontier" offering not only scientific, agricultural, commercial, navigational, medical and biological aid to man's life. Many would be of military value. The report argued that "the greater value (would) be to the civilian community at large." To use a homely example it concluded, "the telephone is certainly a valuable military device but its importance to the civilian community is a matter greater."

This proposal has based upon the assumption that the peaceful civilian exploitation of space was of greater importance than military operations in the case of war and that military use of outer space could be demonstrated with relative clarity, thereby removing the strained civil-military liaison. The committee definitely envisaged the NSB as the single agency in charge of overall planning and basic research for the nation's space effort as well as responsible for the development and operation of civilian missions in space.⁵¹ On the other hand, the military was to develop space vehicles only for specific military requirements which would be provided for only by the prior research efforts of the NSB. The committee urged effective liaison between the military and the civilian agencies but offered no specific suggestions as to how this should be accomplished. By implication a correct division

The proposal suggested future projects in the fields of sounding rockets, earth satellites, lightweight satellite experiments, advanced satellite developments, lunar investigations, planetary and interplanetary investigations, and finally manned space flight. This effort was to be supported with due awareness that space technology would develop gradually; that initial payloads, distances and scientific observations would be modest; and that manned space flight would be in the relatively distant future since it could "not now be very clearly justified on purely rational grounds."¹⁶⁵

The operating criteria of the IGY were perhaps even a purer expression of the scientific view than those of the American Rocket Society and the Rocket and Satellite Research Panel. As participants in an unofficial, apolitical, international scientific alliance and common effort, the IGY Committee was perhaps obliged to discount the political repercussions of the space race - indeed, to discount the very existence of such a race.

Yet more general assumptions were operative. First - and most basically - scientific value judgments were to determine whether space projects rather than other scientific endeavors would be undertaken. Second, within the space program itself the maximization of scientific achievement would serve as the basis for selecting among possible projects. No other considerations were explicitly introduced as criteria for initiating either a space program or any specific project. And throughout the proposal there is no reference whatsoever to military uses of space, prestige purposes of space exploitation, or any specific treatment of commercial or civilian advantages to be gained from space exploration.

This IGY model, while representing the extreme position of the private scientific community, served, therefore, to bolster the arguments of those scientists who wished to stress the scientific nature of space exploration

that might be done on the ground that the Government the overall interests of science. It was increasingly apparent that these advisors were unwilling to jeopardize new-found opportunity for Federal support of science by advocating a disproportionate expenditure on space. Thus their judgment of a proper magnitude for the American space effort was a relatively conservative one.

Of the government scientists outside the White House, those within the military services were, not unnaturally, the most concerned with the space program. These men presented an interesting combination of service and military loyalties and professional scientific competence in viewing the significance of the space effort and its potential organizational structure. In the cases of eleven scientists employed by the military services who answered specific questions before the Preparedness Subcommittee about possible organization of space, all favored centralized Research and Development efforts perceptibly more than the military spokesmen of their respective Services.¹⁶⁴ Predominantly, however, the Air Force scientists were less enthusiastic about centralized direction of the space effort than were scientists in the other Services. Furthermore, in the majority of these cases, the scientists favored civilian control of space along the lines of the proposal of the Rocket and Space Research Panel, of which ten of them were members.

Like other members of the DOD, these scientists stressed the need to integrate scientific and military exploitation of space. They repeatedly cited Project Vanguard as an example of inefficient use of resources, stemming from an arbitrary divorce of military and scientific missions. At the same time, however, six of them argued that scientific exploitation of space was an urgent and necessary mission of Government which would be best organized within the civilian branch.

the Government in the early 1950s, and the group believed the space organization should be located within the DOD and later moved to an independent agency as considered in the Becker and Goldstone Research Panel report and supported by Drs. Hagen and von Braun.¹⁷⁰ In either case, it seems that the scientists within the military establishment were not yet even aware any other specialist group concerned with space. However, the necessity for an organizational solution when world structure proved to be interdependent but not a distinct military and scientific mission.

Among the domestic agencies of Government only the NASA professed interest in space. The National Science Foundation and the AEC viewed the enhanced state of science within Government as an opportunity to pursue their own missions rather than to acquire a new one in space. They neither argued for a major Government program nor space nor publicly expressed ideas as to how space might be organized within the Executive Branch. The NSC, however, did see new agency programs arising from the space mission. As the means of diminishing returns in purely scientific research, the NASA needed an expanded mission if organizational survival. Thus, through internal reorganization and by public advertisement, the Committee sought to provide a responsibility for the Government's space effort.

On November 12 Gen. James F. Doolittle, the chairman of NSC, announced the creation of a new Special Committee on Space Technology within the NSC. With the appointment of this committee's chairman, C. A. Guyford Stever, Associate Dean of Engineering at MIT, on January 12, NASA's promotional campaign began in earnest. On January 13 the NSC adopted a resolution on the subject of space flights, asserting that NASA had within its broad original authority "investigation of problems relating to flight in all its aspects" for

under space emergency and was a...
...work in space research since 1945...
...and expressing that "the urgency of an adequate national program of research
and development leading to manned satellites, lunar and interplanetary flight
is now apparent," the commission proposed that "the space program effort
be 'most rapidly, effectively, and efficiently' implemented by the cooperative
effort of the DOD, the NASA, the National Academy of Sciences, and the NSF."
The proposal reached research, development, and operations... of military
missiles, satellites and space vehicles to the DOD; authorized the NASA to
develop technical services and conduct flight... of scientific satellites and
operations for scientific research in space; and granted certain planning
functions and assessment of research operations to the NAS and the NSF.

On January 26 Mr. Hugh Dryden, the Director of NASA, responded upon the
proposal in a policy statement before the House Committee on Aeronautical Sciences
after citing the administration's position in space exploration both civilian
and military, he concluded:

"There is another solution to the problem of how best to administer
the national space program. The House clearly recognizes the
essential dual role of our agency - the program and the exploration of the
potentials of flight for both scientific and military pur-
poses. Actually, this solution is old and well-tested. It is explicitly
stated in the 1958 legislation which established the NASA with responsi-
bility to supervise and direct and coordinate study of the problems
of flight with a view toward practical solution... The Committee
structure of the NASA... and... and...
elements of aeronautics... the mission of the NASA... designed to
be useful as well as... and the... segments of aeronau-
tics. The entire... of the NASA... based upon the premise that
coordinated... of... provides the surest
guarantee of progress in aeronautics."

Mr. Dryden viewed NASA as essentially suited for the one space mission he
... believed that a major reworking of the agency was in order. He stressed

... military services in accordance with the ... military exploitation of space. The NASA program was ... of civilian activities ... of the ... program should be well coordinated with the ...

There can be ... expanded space agency, ... both within and outside the ... have to ensure ... of resources allocated ... effort which ...

4. The Congress

Like the Administration, the Congress had a general responsibility for space policy. Within Congress, several major legislative, certain key parties, groups, committees and individuals made space policy from particular perspectives, aligning themselves with particular interests within the Executive or the public. These alignments emerged during the period of space policy-making which was characterized by a number of ... of the coalition members.

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share in a process of heightened debate and discussion and that was not typically found in presidential legislative

1) Pre-Session Space Politics:

The initial efforts of semi-independent Congress and policy-making occurred shortly after Soviet 17. The moderate Democrats led by Johnson Rayburn, although lacking a comprehensive legislative program of their own saw themselves as the protectors of presidential security. Maintaining the Administration slow and cautious. They were prepared upon almost any aspect of the space issue to go one step beyond the Administration proposals.

While the Administration worked on the legislative proposal, Johnson gradually built a Congressional coalition both willing and able to engage in at least quasi-independent or free-wheeling action. Johnson fought a determined battle against the paragon Democratic strategy of unrestrained criticism and sought instead to propel the Administration into greater action.¹⁷⁴ The two Texans' major thrust was that the country lacked leadership and that the Democrats would provide it, whether or not the Administration went along.¹⁷⁵ It was this theme which dominated the conduct of the Preparedness Subcommittee hearings and motivated Johnson's frequent pleas for improving the nation's national security posture. By concentrating on such a forward looking strategy, Johnson alternately ignored and disparaged the current paragonism of both Liberal Democrats and conservative Republicans. Although unable to divest the space issue from all partisan overtones, it was he more than anyone else in Government who raised the space issue to a level of truly national debate, a level at which the Eisenhower Administration remained implicitly, if not explicitly, on the defensive.

By the end of 1959, the Administration

affairs took the back as the Administration's policy was to
national program to meet the basic needs of the people. The
was complementary to the Administration's policy. The
the Administration could make decisions and act on them. The
Johnson Raftern branch of the Democratic party in Congress. The
group called for a bipartisan review of defense policy, emphasizing
with the aim of securing a more effective program and emphasizing the
need for coordination in the various and various programs. Sen. Stuart
Bridges, emerging as the day's spokesman for this group, reported the criticism
that Congress could not get the job done was necessary for the defense effort
and that mistakes and errors were being made. The program of the
Government could provide.

There were many Congressmen and the Administration as impelled these
Republicans to take their criticism. The Administration's strategy of the moderate
Democrats emerged as the dominant strategy of the session, or was it. The
interest of moderate Republicans in going to order to limit as much as
possible the freedom with which the Administration could act as the defender of national
security.

This resolution of the Proceedings Subcommittee on Security as the
specific instrument by which Congress was to lead the space policy-
making process. The Subcommittee's findings and recommendations were
was itself a broad examination of the defense posture of the U.S. and
directly focused upon the space program. The review of past and future
space projects, the Subcommittee's recommendations and conclusions were
later enjoy broad Congressional success and which had a major impact on the

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effect of the above mentioned factors.

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context of national defense policy. In this setting, the Department's efforts were chiefly on the DOD's effort. As the inquiry wore on, the Department's competence in scientific Research and Development, in particular, was not laudatory. Accordingly, the Subcommittee concluded somewhat indirectly that a great deal of the space program belonged elsewhere.

In this context, the Subcommittee criticized the Department's organizational arrangements for the missile and satellite programs; the estimates of the existing military situation; and its failure to anticipate the space challenge. It dealt with particular harshness with Quarles and Holsday, responsible officials before the Sputnik crisis. Chief Counsel Edward Weiss and Sen. Johnson were brusque in their questioning of both men and emphatic in their belief that the officials lacked a real sense of urgency. After a particularly acid review of Quarles' speech to the U.S. Conference of Mayors, in which Quarles argued that the Soviet Union did not have an operational ICBM capability and that their satellites had not been of military significance, Johnson remarked:

"If that is your idea of a speech that is calculated to arouse people...to spur them to expedite the existing program, to chart new courses, to outline new goals, to regain a superiority that has been lost...then your evaluation of the effect of the speech is different from mine. ... There is a great feeling, I think, in the committee and in the country that there has been already in a real hurry about this whole situation and there has been a lot of public officials who have been making statements which are calculated to laugh the whole thing off."182

Never losing this suspicion of the DOD, the Subcommittee came to feel that the OSD was less concerned about space than the Congress, some scientists,

some service representatives, and the public. Nor did the Subcommittee conclude that the Department had sufficient appreciation of the value of scientific research. It reviewed exhaustively the present satellite program; then expressed shock, consternation, and incredulity about the whole affair. In particular, it disapproved of the Department's refusal to recognize the propaganda value of satellites by failing to authorize Project Explorer after September, 1956.¹⁸³ To the Senators, the current satellite effort seemed "relatively small, ...relatively unsuccessful, and certainly late."¹⁸⁴ To the Committee the Vanguard decision and its dismal aftermath underscored the danger of assigning low priority to scientific in contrast to military Research and Development, and in making decisions on the basis of service rivalries. To the members, the need for new arrangements for advanced Research and Development was clear.

* Indeed, this conviction led to a game of "can you top this" between Weisl and Quarles:

Weisl: "I know that the members of the Committee, after hearing the evidence that we have heard, are tremendously aroused over the potential threat."

Quarles: "I doubt that any member of the Committee is any more aroused about the threat than I am, Mr. Counsel."

Weisl: "And we feel that the public must be aroused...so that they will make the sacrifice...necessary to meet that danger."

Quarles: "I have just stated that I was at least as aroused as any member of the Committee, Mr. Counsel."

Weisl: "I can assure you that the Committee is--"

Quarles: "Pretty aroused."

Weisl: "Very aroused."

As a consequence of Committee's emphasis on the OSD role, its members gave special weight to the opinions of representatives of the scientific and military communities who favored a more urgent effort. These witnesses possessed the expertise necessary to meet the crisis and they seemed natural partners for the Congressmen. The Subcommittee displayed marked deference to the scientific witnesses. It praised the loyalty and contributions of Teller, Bush, von Braun, and Van Allen and reiterated the legislative intent to expand research facilities and resources.¹⁸⁵ The Committee also paid its respects to military men who might oppose the official OSD posture.

Half-way into the hearings the retirement of Gen. Gavin seemed to provide a dramatic substantiation of the Subcommittee's fears. Gavin was popular with the Committee, which openly admired his tenacity in pushing Project Explorer in the face of OSD opposition and his general espousal of scientific Research and Development as a crucial factor in military preparedness. After his initial testimony on December 13 Johnson commented "you talk like the kind of fellow that I have been looking for ever since we started these hearings, and that is a fellow who thinks that things can be done perhaps a little bit faster and perhaps a little bit better....(I am not convinced that) the higher echelons are what I call can-do fellows."¹⁸⁶ At the end of the day, after Gavin had recounted rather vividly the fate of Project Explorer, the need for drastic reorganization of the DOD, and his own fear of the consequences if America continued to ignore space, Johnson and the other members were clearly impressed.

Accordingly, Gavin's announced retirement in late December gravely disturbed Committee members, who suspected "Administration rubber-hose tactics" might have forced Gavin to resign. When Gavin reappeared before the Committee on January 6, he reiterated that he could not support the Army Research and Development

budget; and animated that his chances for assuming the COMARCOM command, which he desired, had been denied because of his earlier outspoken testimony.

When he stated that he preferred to retire rather than mislead Congress, Johnson exploded.

"General, I just think this is a horrible situation. I am surprised that it exists....I do not think there has been a time in the 25 years that I have been in Congress when we needed men of your capacity, your experience, and your foresight as much as we need them now. We are trying to get to the bottom of this thing....We are concerned; the people are concerned. We want leaders whom we can trust and who will speak frankly, and whose only language is the language of candor. We think you are one of them...I hope, General, that you will reconsider because I do not want an Army or a Navy that is made up of just a group of yes men. I think that that is just what we will get if you come up here and put it on the line as you see it and then resign."¹⁸⁷

The facts of the Gavin case -- which to the outside observer, appeared more ambiguous than Gavin had outlined them for the Committee -- are not at issue here. The significance of the episode was its impact on the Senators. Now they were even more persuaded that the Administration underestimated the crisis and more than ever determined to correct the situation.

When the unanimous report was issued, three important themes appeared to form the basis for future Congressional action. First, the Senators were clearly convinced space exploration was an important national objective. Second, they were prepared to consider radical organizational changes urging that the Administration "accelerate and expand Research and Development programs, providing funding on a long-term basis, and improve control and administration within the DOD or through the establishment of an independent agency."¹⁸⁸

Finally, by emphasizing the criticality of the situation and the Administration's apparent inability to meet it, the Preparedness Subcommittee declared Congress' willingness to embark on an independent course to assure a greater space effort.

(2.) The Emergence of Senator Johnson

As the Preparedness Subcommittee's hearings ended it was apparent that Lyndon Johnson's early strategies were bearing fruit. Partisan controversy had been minimized and semi-autonomous Congressional participation in the policy-making process secured. Now, the strategy required that Johnson maintain his bipartisan coalition and convince the Administration to work closely and informally with a Democratic-led Congress.

The partisan controversy over space did not die but it became an increasingly false issue as Johnson initiated his master plan of bipartisan prodding, and the Administration moved with him. That Johnson believed this course of action would lead to the best attainable defense posture is unquestionable. In addition, however, he had tremendous personal investment in such statesmanlike behavior. His recognition of the significance of space for him had, if anything, increased since October 4 and he was determined to pursue the course of action he had embarked upon the Preparedness Subcommittee hearings. Indeed, his private consultations and negotiations in Washington, his speeches and their timing comprised a virtuoso performance. In tour across the country he outlined a massive civil and military space program under a new independent space agency; called for increased missile production of such magnitude as to delight the Army and the Air Force and appall the Comptroller General of the BOD; and advocated a space effort under the UN to conquer the new frontier for purely peaceful purposes. 189

The Majority Leader's master stroke, however, was his own "private State of the Union Message" which he delivered to the Democratic Party Caucus two days before the President's. It was no ordinary review of a Committee's findings by its Chairman nor an ordinary catalogue of problems delivered off the cuff

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basic research, and increased military investment in advanced Research and Development. Third, he sought scientists to manage the space program and "from the evidence accumulated, we do know the evaluation of the importance of control of outer space made by the U.S. has not been based upon the judgment of men most qualified to make such an appraisal."¹⁹¹ Fourth, he wanted the United States in a position of unquestioned domination of space. ["There is something more important," he argued, "than any ultimate weapon; that is, the ultimate position...of total control over earth (which) lies somewhere out in space."¹⁹²] This effort would entail development of a missile capability, but would extend far beyond it. More significant, however, was that such military domination would provide for the first time in history, an escape from war, and make total security possible. Finally, Johnson called for a new advanced weapons and space agency outside the DOD, on the model of the AEC. Only such a structure, under a President who recognized the significance of outer space for America, could coordinate and maintain a top-priority space program.

The political repercussions of this "message" were immediate and far-reaching. It was clear that Johnson, for his own and his country's welfare, would press for a major space effort. How far he would pursue this goal within his self-imposed confines of positive cooperation with the Administration remained an open question. Two facts were certain: he would await the initial suggestions of the Administration in order to build upon them according to his evaluation of their merit. And he would be a potent ally for any other official or group who wished a greatly expanded program in scientific and military exploitation of outer space.

There was nothing parochial in Johnson's position. Unlike military spokesmen

of members. He was very active in the process of shaping the future form. The result of his efforts was to establish his own interests as those of the Congress at a level of importance rarely seen in the process of policy making in a modern state.

Johnson was not the only Congressional figure with a role to play in space. Somewhat as a counterweight to Johnson and representative of a more traditional behavior pattern which sought to dispose expeditiously of Presidential business, House Majority Leader John McCormack emerged as a secondary power in the legislative process. His concern with space stemmed from a long-time personal interest in scientific progress, experience with Government efforts in scientific development since World War II, and interest in science-based industry such as that surrounding his home district in Boston. These interests gave McCormack's posture a more conventionally bipartisan flavor than Johnson's. He acted more to expedite policy than to initiate policy, and was in general willing to accept Administration leads. These different political stands would greatly affect the final product of the National Aeronautics and Space Act.

Finally, although no other members of Congress were so crucially concerned with space as Johnson and McCormack, a variety of proposals for space policy from a variety of sources were introduced during the initial months of the session. The most significant of these supported Federal aid for education, new governmental organization of the scientific effort, and reorganization of the DOD. Others specifically dealt with space. Prior to the submission of the Administration's space bill, the bills reflected particular authors' interests, whims and loyalties. Sen. Anderson, Rep. Bonfield and Rep. Durham, for example all members of the Joint Committee on Atomic Energy, introduced similar bills.

Sen. Johnson, with Sen. Knowland's support, introduced a resolution introduced by the Preparedness Subcommittee creating a Special Committee on Space and ~~Aeronautics to frame~~ Astronautics to frame legislation for a national space program.¹⁹⁸

The resolution passed the Senate on February 6 and the Committee was "authorized and directed to conduct a thorough and complete study and investigation with respect to all aspects and problems relating to the exploration of outer space and the control, development and use of astronomical resources, personnel, equipment and facilities."¹⁹⁹ It consisted of seven Democrats and six Republicans, a blue-ribbon group which included eleven ranking members of the six standing Committees whose fields of jurisdiction space might affect. The Committee was considered so prestigious that the Senate leadership invoked the Seniority rule to select its members: Bridges the ranking member of the Appropriations Committee; Russell and Saltonstall, the Chairman and ranking member of the Armed Services Committee; Anderson and Eichenlooper, the vice chairman and ranking Senator of the Joint Committee on Atomic Energy; Green and Wiley, Chairman and ranking member of the Foreign Relations Committee; McClellan and Mundt, Chairman and ranking member of the Committee on Government Organizations; Magnuson and Briker, Chairman and ranking member of the Interstate and Foreign Commerce Committee; Symington, a member of the Armed Services and Government Operations Committees who, although outranked on both, was selected on the basis of his wide experience in Government; and Johnson, who had introduced the resolution and thereby traditionally qualified for selection. On February 20 Johnson was elected chairman.

This committee was especially qualified to execute Johnson's space policy. As a function of their status its members were relatively autonomous political powers. Many had gained experience in the Preparedness Subcommittee Hearings.

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such activities. ²⁰⁴

Thus, the Congress indicated a strong interest in the space program. While in setting up earth space effort, the House of Congress was demonstrating a new era of Congressional activity -- a step not taken before. In the National Legislature there are visions and more typical legislation. Specific authorizations of space effort were tentative, signalling the Congress' interest in a new approach to space as soon as forthcoming. Early the Congress had indicated that at least a portion of the space effort should be on civilian hands. There was no serious proposal to organize the space effort under the DOD since Congressional control of space activities was desired by permitting AFSA responsibility for its own space programs for only one year. The Congress indicated that the space effort was unlike the military or unlike the maritime in space.

Most important of all, when the Congress gave high priority to the future space program and its organization. Neither defensive nor offensive in nature, the Congress proposed to push both civilian and military programs. Congress wanted a major space effort. It exerted its own authority in organizing these very early in the final space program would be a major Executive-legislative effort.

Like other precedents in the formulation of space policy, Congress remained dependent upon the President to show his hand. With the scientists and the military speaking, the legislative branch received a final point for

position. Not having established his preferences, the Administration leadership in Congress awaited the Administration bill before making its final round of strategic choices.

IV: PRESIDENTIAL CHOICE: THE DRAFTING OF THE BILL

The military establishment's intense and growing concern with space; the new political visibility of the scientists; and the Congressional pressures for a broad-gauged space effort, taken together, guaranteed space a high priority on the agenda of national affairs. It was clear that "doing something" on a major scale about space was necessary. What remained to be established was the character and magnitude of the effort. This was the province of the Administration's choice.

The Administration chose a visible, substantial response: the establishment of a high level agency with a clear mandate to pursue broad programs of exploration and development in space. The bill, submitted by the President, created an independent civilian space agency under a single administrator, charged with the direction of basic research and non-military projects in outer space. It was faithful in its provisions to Eisenhower's earliest reactions to the challenge in space, primarily his insistence upon civilian control for non-military space programs.²⁰⁵ It reflected, too, the aims and preferences of three special groups of influentials who came to dominate the drafting process.

That process, which began in the Executive Office just after the launching of Sputnik II, was a relatively secretive one. It initially involved officials from the White House, particularly from PSAC and Killian's office. Later it included the Bureau of the budget and the NASA, upon which the new agency was built.

Eisenhower had charged with design of a space program and the PSAC
when it was agreed that NASA could be the base on which NASA could be built.
The Bureau of the Budget, perhaps guided by Kefauver's input of the PSAC's
deliberations, reached the same conclusion. Applying a "cost-benefit" approach
separate appraisals of a major long-range administrative problem, long-range
a high continuity of research.

For an executive order creating a "National Science Foundation" (the PSAC, usually
reserving the increase of the scientific community through a primarily civil
structure on which basic research and important peaceful space missions could
be pursued free from military control. The PSAC provided such a structure.
Furthermore, the ongoing tradition of research and development and staff could be
expanded at a rate which the scientific advice be considered consistent with the
overall scientific interests of the Government.

PSAC's organizational preferences stemmed from their body's conception of a
subservient space program. These guidelines - as later outlined in the Panel's
Committee's report "The National Science Foundation" - identified four major
factors which made the advancement of space technology imperative:

"The compelling urge of man to explore and to discover; defense objectives;
national prestige; and new opportunities for scientific observation and
experiment."²¹⁰ Of these four, one Committee was primarily concerned with
scientific activity, outlining a variety of research purposes for scientific
satellites. It argued that "the present research had a 'remarkable way
of paying off' and that, hence, it could be predicted the future utility of
space ventures. The "basic" questions came from."²¹¹

"Much has been written about space as a means of defense or such suggestions as satellite bombers, military bases on the moon and so on...for the most part, even the more sober proposals do not hold up on close examination, or appear to be achievable at an early date... In short, the earth would appear to be, after all, the best weapon-carrier."²¹²

With such emphasis on civilian space activities as a part of a social scientific program, building NASA around NACA seemed to PSAC the "natural" organizational solution.

On NACA's part, interests of organizational survival coincided with a substantive outlook similar to that of the PSAC.²¹³ NACA acknowledged the importance of military objectives in space more readily than the PSAC, but NACA spokesmen concurred that civilian and scientific objectives might well be subordinated in a military agency. Thus NACA favored separating civilian from military exploitation of space, viewing this two-space-agencies solution as parallel to the dual NACA-NAS structure which had supported aeronautical technology for forty years.

Finally, the Bureau of the Budget viewed NACA as an administratively neat solution by its own special criteria. The Bureau as a rule does not enjoy creating new Executive agencies, on the theory that current administrative resources should be utilized for new missions if at all possible. In Director Maurice Stans' words:

"Retrospectively, a major objective of the legislation was to build upon existing institutions and to avoid increasing the total number of Federal Agencies involved in aeronautical and space matters... The bill accomplishes this aim by utilizing the NACA as the nucleus of the new agency."²¹⁴

Thus, the upgrading of NACA offered an efficient and economic administrative arrangement.

for a new space program by conventional organization and management. Associate Director William Finnan believed that the management planners had "read too much, or perhaps too little, science fiction in the past... and as it required the applications of a special mental discipline to be sure that they were planning for the organization and administration of the program being officially conceived and not for the even more fantastic projects being speculated about in public."²¹⁵ When Killian specifically requested aid in writing the bill, however, the Bureau took the opportunity to incorporate its favorite tenets of streamlined administrative management into this seemingly occult agency.

By February 4, thus, when Eisenhower publicly announced the establishment of the Purcell Committee and charged it with dominating America's future space program, the Executive Office had already agreed that a new civilian space agency would be built upon the NACA structure.²¹⁶ Thereafter, the drafting process proceeded with an increasing sense of urgency. Public and governmental uncertainties about the management of the space mission were rising and the President was eager to send a bill up before the Easter recess, eliminating any further opportunity for independent Congressional space policy-making. Work on the legislation was thus done under "crash" conditions by a selected and limited group of policy-makers in Killian's office, the NACA, and the Bureau of the Budget.

The actual drafting committee met first in late January or early February. The men worked under the overall aegis of the Bureau's Division of Organization and Management and consisted of William Finnan, the Assistant Director in charge of that Division; Alan Dean, one of its senior staff members; Paul Dembling, the Legal Counsel to NACA; S. Paul Johnston, Director of the Institute for

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Two other principles long favored by public management experts at the Bureau were also incorporated. The drafters relied on administrative flexibility and inter-agency cooperation in place of detailed prescriptions to set the boundaries of agency operations. In the first instance, the enabling language was general since the character of the space mission was so relatively unknown. Relatively unfettered executive discretion would permit the President and the Director to continue to shape the substance of the space effort. Second, inter-agency coordination was to be secured through regular channels of the Executive Branch; the legislation avoided statutory liaison committees or specific designations of membership on the advisory board.

In short, the liaison process was to continue the informal relations with the DOD, NSF, AEC, Weather Bureau and Department of State which NASA had previously established with considerable success. Where working-level liaison and joint participation in space projects broke down, the President would resolve disputes and ultimately determine overall national space policy. Thus the NASA emerged not as an overall national policy-making agency for outer space activities, but rather as a regular arm of the Executive Branch specifically devoted to pursuing basic research in space sciences, operating space experiments in conjunction with other government agencies, and cooperating with the military establishment in Research and Development of military interest.²²¹

These concepts were supported both by NASA and PSAC for they confirmed the old agency's working experience and appealed to the scientists as logical extensions of their basic aims. But the Budget Bureau provided the rationale of the arrangements. To Finnan the working group had a priceless opportunity to write a "kitchen stove kind of bill" based on optimal administrative theory, complete with such heretofore exotic touches as exemption from Civil Service

1. *Introduction*

2. *Background*

3. *Methodology*

4. *Results*

5. *Discussion*

6. *Conclusion*

7. *References*

8. *Appendix*

9. *Index*

10. *Glossary*

11. *Notes*

12. *Footnotes*

13. *Tables*

14. *Figures*

15. *Summary*

16. *Abstract*

17. *Keywords*

18. *Subject Headings*

19. *Indexing*

20. *References*

21. *Appendix*

22. *Index*

23. *Glossary*

24. *Notes*

25. *Footnotes*

26. *Tables*

27. *Figures*

...on the one hand and the other hand...
York and Bo, Johnson of AASA and Assistant Secretary Macdonald of the Air Force...
all testified later that they had discussed certain reservations about the bill
demarcation of military-civilian space jurisdiction with the General Counsel
and Quarles during the day allotted to them to hear their ideas did not get
into the draft. Each was unhappy with the deadline and argued that a longer
period could have produced a better bill. Bushner and Macdonald, while not sub-
mitting formal comments to the bill, did make suggestions to Quarles which
did not see print.

at this stage.

Nevertheless, open inter-agency conflict did not result. The OSD concluded
that essentially the bill was an extension of the DOD-MACA relationship and
interpreted its working guidelines to mean that the DOD was still free to pursue
the military space mission as it chose.²³⁰ Thus, dissent of the services and
the AFSA was foreclosed for the moment to appear in visible form when the
bill reached Congress. Yet, significantly, the inter-agency clearance process
did not produce full Executive support behind the Administration bill. The
civilians continued to minimize the military program. The OSD remained content
in its belief that NASA like NACA before it would function as a help-mate in
projects which AFSA was willing to relegate to it.^{And} the legislation remained
the draft in which Dr. Millard's office, the Bureau of the Budget, and the NACA
participated...the compromise (in which) was the bill which the Administration
sent up to Congress.²³¹

Apparently, the President expected to adumbrate the latent conflicts arising
from different expectations of the space program through executive action. He
directed the DOD to coordinate space projects with the NACA, the NSF and the
National Academy of Science.²³² He also asked the Defense Establishment to pre-
pare an operating plan to assure support for the new agency either through

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the space is also to be used for other purposes, and is not
unpopular to the Committee.²⁷⁰ Several other members of the House saw the
proposal as merely a way of updating and upgrading the ⁶ ~~the~~ ^{likely} ~~only~~ ^{to}
in "doing business at the same old stand."²⁷¹

The Committee was especially disturbed by the testimonial conferences where the university had conferred over the operations of the NSA through not leaving the a substantial role in the space program as such as not denied that anyone of the Committee had interpreted the meaning of the NSA from con- ducting basic measures or is fulfilling the NSA in the performance of its "proper functions" in the Committee was to ensure NSA independent civilian status.²⁷² In contrast to the view of the military, the House interpreted the
language of section 6 which provided that the agency might act on behalf of or
in cooperation with the military as well as in support of systems or military
operations as a possible indication that the NSA was not all original power
from the NSA unless the NSA provided its own part in its space
activities. McConaugh stated that language gave the NSA complete voice in deter-
mining to what extent the NSA should support military operations since almost all
space missions might be associated with either support systems or military
operations.²⁷³ Only after two weeks of hearings was McConaugh persuaded that
the Administration's arguments for civilian control were sufficient. Then he
acknowledged that Generalissimo Francisco Franco was not a civilian agency
had revised his testimony for the Administration's position which had previously
seemed vulnerable to military domination.

²⁷⁰ This anti-Dryden campaign on the part of the House ultimately denied him his
expected promotion as the Administrator of NASA.

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Johnson declared with some hesitation ...
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agency to pursue a new and important area of activity in the
direction of the President and included several provisions of the
of the House

The report also recommended the establishment of a National Aeronautics and Space Administration to the United
Functions which the President and Administrator of the National Aeronautics and Space Administration
Administrator for the National Aeronautics and Space Administration
making certain. The report also recommended the establishment of a
structure. The Senate Committee on Aeronautics and Space recommended the various
problem of general space policy. The Committee on the Executive Order
of the President and the Secretary of State, Secretary of Defense, Assistant Secretary of the Navy and
representatives of other agencies. The Committee on the Navy and the
the Board was formed by a Memorandum from the President to the JCS and the
DOD. The report also recommended the establishment of the work of the
other principal Government agencies. The report also recommended

The Senate report also recommended the establishment of a committee
concerned in the course of the execution of their functions. The report also
established as a governmental body. The report also recommended the
operational procedures. The report also recommended the establishment of the
President, the Board was to conduct a new form of activity. The
recommend a committee to conduct a new form of activity. The
designate responsibility for major projects and resolve inter-agency conflicts
in non-aeronautics activities. The report also recommended the establishment
and space would be responsible to that of the National Security Council with

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prop. 11. The Senate heard the public bill and its bill alone for 1965 as a characteristic of urgency and breadth necessary for a successful space program.

Preliminary attempts to resolve differences at the staff level failed. For several weeks the only contacts between the two Houses were those between Mrs. Wilene Callaway, special counsel to the Senate, and Dr. Charles F. Kildan, associate staff director of the House Committee, who could meet in the neutral territory of the Capitol Hill Conference Room.³⁰⁹ The House staff tried to persuade the Senate to accept the House position. They believed that Johnson was unwilling to compromise his position by holding out for the Senate bill or not at all.

At this juncture, the White House intervened. The stimulus seemed to come from Senator Johnson. He said that he was willing to let Dr. Kildan see the House position and to let the President.³¹⁰ During this intervention the President's position was not directly related to the space program - agreed to a verbal agreement with the House.

When Kildan returned, the White House had a list of his wishes. With Administration concurrence, and with a record of support for Administration space policies, Dr. Kildan was now prepared to accept the House position. In this atmosphere and with the major outstanding issues settled -- the wording of Section 1 and the Administration's position on the negotiations for a conference committee meeting -- the House of Representatives formulated of Congressional Committee; and the House of Representatives, and patent procedures. Both Houses agreed that the agreement was signed by international cooperative ventures under the House's policy guidance of the President.³¹¹

The Senate abandoned its demand for a joint Committee and accepted the standing

(No. 1125). The House accepted the bill a point of order was raised. After soundings completed, the Conference Committee met for one session on July 15 with Johnson in the chair. The agreements were ratified and the conference accepted the bill.⁴⁰

In addition to three compromise proposals reached in conference, the final bill contained three agreements made by the first House with the Administration. Section 2 finally read: "(aeronautics and space activities) shall be the responsibility of and shall be directed by the [blank] for [blank] exercising control over aeronautics and space activities [blank] by the [blank] through [blank] activities peculiar to or [blank] associated with the development of weapons systems, military operations, or the defense of the U.S. [blank] the Research and Development necessary to make effective provision for the defense of the U.S.) shall be the responsibility of and shall be directed by the [blank]."⁴¹ This wording represents a victory for the Senate although [blank] the clarifying language about Research and Development [blank] by the House.

* These granted title to the NASA except under certain specified conditions in which the Administrator could waive title to the invention. The provisions were written in the O'Mahoney subcommittee on [blank] of the Senate Judiciary Committee. During June the patent attorneys of the [blank] and their clients had argued in favor of the original Administration assumption that NASA patent procedures would follow the [blank] making patent rights in the contractor in exchange for free use of the patented invention by the Government. Resisting such pressures, the Senate wrote its [blank] provisions. See [blank], section 305.

** The conference bill was principally drafted by the House Staff, see Griffith, Chapter IX. The House Committee on Science and Astronautics was established on July 21 in House Resolution 582 on the basis of [blank] Report #1037 "Amending the Rules of the House to provide for a Committee on Science and Astronautics. The Senate amended its rules to create a Committee on Aeronautical and Space Sciences in Senate Resolution #327 on the basis of [blank] Report #1025.

Spokane I see so much... program had not been sufficient... community espoused were... was realized and the space...

Two conclusions could be drawn from... of the space enterprise... objectives which go far beyond... and even beyond... Gratification of the program... the simultaneous pursuit of... in character. Secondly, if the... to achieve a substantial number of... concept with... enactment of the law did not mean the... It simply signalled a... concerned with the overall... of Research and Development... talent. NASA in 1958 was the beginning of...

the 1990s, the number of people in the world who are undernourished has declined from 1.1 billion to 800 million. The number of people who are malnourished has declined from 1.5 billion to 1 billion. The number of people who are obese has increased from 100 million to 300 million. The number of people who are overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million.

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1. The first group of authors (e.g., [1, 2]) has shown that the use of a single, common, and simple model for the entire system is not only possible but also convenient. The authors of [1] have shown that the use of a single model for the entire system is not only possible but also convenient. The authors of [2] have shown that the use of a single model for the entire system is not only possible but also convenient.

3. See Re Board of Control (The American Bar Association, 1937), October 7-8, 1937.
30. See NYT, October 14, 1937.
31. See NYT, October 14, 1937.
32. NYT, October 15, 1937.
33. See NYT, October 17, 1937 and NYT, Chapter III, Sections and 2.
34. NYT, October 17, 1937.
35. See NYT, October 17, 1937.
- At this meeting, the Board of Directors of the National Social Foundation's Research Fund, Research on National Resources of Blackboard, the Board of Directors.
36. NYT, October 17, 1937.
37. See NYT, October 17, 1937 and NYT, October 17, 1937.
38. See NYT, October 17, 1937.
39. NYT, October 17, 1937.
40. NYT, p. 270. See NYT, October 17, 1937.
41. NYT, October 17, 1937.
42. See NYT, October 17, 1937.
43. NYT, October 17, 1937.
44. See NYT, October 17, 1937.
45. See NYT, October 17, 1937.
46. See NYT, October 17, 1937. See NYT, the statements of Dr. Lloyd T. Fordham, and NYT, Dr. Joseph Kaplan, and others.
47. NYT, November 3, 1937.
48. NYT, October 17, 1937.
49. NYT, October 17, 1937.
50. NYT, October 17, 1937.
51. NYT, October 17, 1937.
52. NYT, October 17, 1937.
53. NYT, October 17, 1937.
54. NYT, October 17, 1937.
55. NYT, October 17, 1937.
56. NYT, October 17, 1937. See NYT, October 17, 1937.
57. NYT.

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57. Samuel P. Huntington, The American Bar Association and London, 1937, p. 100.
58. NYT, November 1, 1937.
59. NYT, January 1, 1938.
60. See NYT, January 1, 1938.
61. NYT, February 1, 1938.
62. See NYT, January 1, 1938.
63. See NYT, February 1, 1938 and NYT, January 1, 1938.
64. See NYT, February 1, 1938.
65. See NYT, January 1, 1938.
66. See NYT, January 1, 1938.
67. See NYT, January 1, 1938.

68. NYT, November 19, 1957. See also NYT, March 10, 1958.
69. See NYT, December 5, 1957.
70. See NYT, January 11, 1958.
71. NYT, November 14, 1957.
72. NYT, February 5, 1958.
73. For further discussion of the evolution of the Administration's position on space, see ibid., Chapter IV.
74. NYT, February 16, 1958.
75. NYT, March 27, 1958.
76. U.S. House of Representatives, Hearings Before the President of the United States Relative to Space Policy and Exploration, Document 905, 85th Congress, 1st session, April, 1958.
77. See NYT, November 11, 1957.
78. SPSCN, pp. 181-184, testimony of Winston Churchill on United Nations Committee.
79. See ibid., p. 184, testimony of Eisenhower, Secretary.
80. ibid., p. 217, testimony of Eisenhower, Secretary, emphasis added.
81. See NYT, December 1, 1957, NYT, October 21, 1957, and NYT, February 1, 1958.
82. SPSCN, pp. 184-187, testimony of Eisenhower, Secretary.
83. See NYT, November 14, 1957.
84. See SPSCN, p. 211, testimony of Eisenhower, Secretary.
85. NYT, December 12, 1957.
86. SPSCN, p. 214, testimony of Mr. Eisenhower.
87. ibid., p. 218, testimony of Secretary, Secretary.
88. ibid., p. 219, testimony of Mr. Secretary.
89. See ibid., pp. 20-21.
90. See Washington Post, December 12, 1957, statement of Mr. Dan Kimball, president of American Nuclear Energy.
91. See also Robert Conrad, Analysis of Policy Issues on ARPA, U.S. House of Representatives, Committee on Government Operations, Research, Information and Management of Missile Programs, 1958, p. 117.
92. NYT, January 10, 1958.
93. Department of Defense, Statement, 68107-13.
94. See NYT, pp. 112-113, testimony of Mr. Herbert Gold.
95. SPSCN, p. 183, testimony of Secretary, Secretary.
96. ibid., p. 221, testimony of Secretary, Secretary.
97. ibid., p. 213, testimony of Mr. Secretary.
98. See NYT, November 14, 1957, NYT, 1958, NYT, December 4, 1957.
99. See NYT, March 1, 1958.
100. See SPSCN, p. 171.
101. ibid., p. 184, testimony of Admiral Arthur W. Radford, Chief of Naval Operations.
102. See ibid., p. 170, testimony of Mr. Radford.
103. ibid., p. 171, testimony of Mr. Radford.
104. NYT, November 1, 1957.
105. See NYT, November 11, 1957. See also SPSCN, 1958, pp. 170-171, testimony of Mr. Radford.
106. SPSCN, pp. 181-184, testimony of Mr. Radford.

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